

# Search Report

## EIC 1700

STIC Database Tracking Number: 229466

To: KUO-LIANG PENG  
Location: REM-10A71  
Art Unit: 1712  
Wednesday, July 11, 2007

Case Serial Number: 10/520763

From: KATHLEEN FULLER  
Location: EIC1700  
REM-4B28 / REM-4B19  
Phone: (571)272-2505

kathleen.fuller@uspto.gov

### Search Notes

L1 ANSWER 1 OF 1 HCAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2004:60574 HCAPLUS  
 DN 140:94920  
 ED Entered STN: 26 Jan 2004  
 TI Hybrid polymers for functional tuning of microfluidic device surfaces  
 IN Augustine, Brian H.; Landers, James P.; Ferrance, Jerome P.; Polefrone, Joy; Hugues, W. Christopher  
 PA University of Virginia Patent Foundation, USA; James Madison University  
 SO PCT Int. Appl., 43 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM C08G  
 CC 37-3 (Plastics Manufacture and Processing)  
 FAN.CNT 1

*application - not  
indepd with  
Si rings.*

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004007582	A2	20040122	WO 2003-US22162	20030715
	WO 2004007582	A3	20040325		
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
	AU 2003251935	A1	20040202	AU 2003-251935	20030715
	US 2006057402	A1	20060316	US 2005-520763	20050110 <--
PRAI	US 2002-396153P	P	20020715		
	US 2002-399633P	P	20020730		
	WO 2003-US22162	W	20030715		

## CLASS

PATENT NO.	CLASS	PATENT FAMILY CLASSIFICATION CODES
WO 2004007582	ICM	C08G
	IPCI	C08G [ICM,7]
	IPCR	B01L0003-00 [N,C*]; B01L0003-00 [N,A]; G01N0027-447 [I,C*]; G01N0027-447 [I,A]
	ECLA	G01N027/447B6
AU 2003251935	IPCI	B32B0017-06 [ICM,7]; B32B0025-20 [ICS,7]; B32B0025-00 [ICS,7,C*]; C09J0143-04 [ICS,7]; C09J0143-00 [ICS,7,C*]
	IPCR	B01L0003-00 [N,C*]; B01L0003-00 [N,A]; G01N0027-447 [I,C*]; G01N0027-447 [I,A]
US 2006057402	IPCI	B32B0009-04 [I,A]
	IPCR	B32B0009-04 [I,A]; B32B0009-04 [I,C]
	NCL	428/447.000

AB A microfluidic device comprises a body structure provided with a microchannel and an inlet port and an outlet port, wherein the inlet port and outlet port are formed on an exterior surface of the body structure and are in fluid communication with the microchannel, wherein the microchannel has an interior surface that is coated with a polymer comprising Me methacrylate repeating units and acrylate derivs. of polyhedral oligomeric silsesquioxanes. In addition the polymer can be used to coat microchannels to enhance the phys. properties of the microdevice.

ST microfluidic device POSS MMA polymer coating; silsesquioxane acrylate  
polymer coating microfluidic device

IT Apparatus  
(microfluidic devices; hybrid polymers for functional tuning of  
microfluidic device surfaces)

IT Glass, uses  
Polycarbonates, uses  
Polyesters, uses  
RL: DEV (Device component use); USES (Uses)  
(substrate; hybrid polymers for functional tuning of microfluidic  
device surfaces)

IT Plastics, uses  
RL: DEV (Device component use); USES (Uses)  
(thermoplastics, substrate; hybrid polymers for functional tuning of  
microfluidic device surfaces)

IT 80-62-6D, MMA, polymers with polyhedral oligomeric silsesquioxanes  
RL: POF (Polymer in formulation); TEM (Technical or engineered material  
use); USES (Uses)  
(hybrid polymers for functional tuning of microfluidic device surfaces)

IT 7631-86-9, Silica, uses 9011-14-7, PMMA 25038-59-9, Polyethylene  
terephthalate, uses  
RL: DEV (Device component use); USES (Uses)  
(substrate; hybrid polymers for functional tuning of microfluidic  
device surfaces)

=>

S E1-E4

1 25038-59-9/BI  
(25038-59-9/RN)

1 7631-86-9/BI  
(7631-86-9/RN)

1 80-62-6/BI  
(80-62-6/RN)

1 9011-14-7/BI  
(9011-14-7/RN)

L2 4 (25038-59-9/BI OR 7631-86-9/BI OR 80-62-6/BI OR 9011-14-7/BI)

=> D SCAN

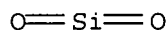
L2 4 ANSWERS REGISTRY COPYRIGHT 2007 ACS on STN

IN Silica

ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT

MF O2 Si

CI COM



\*\*PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT\*\*

HOW MANY MORE ANSWERS DO YOU WISH TO SCAN? (1):3

L2 4 ANSWERS REGISTRY COPYRIGHT 2007 ACS on STN

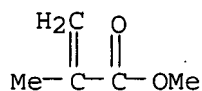
IN 2-Propenoic acid, 2-methyl-, methyl ester, homopolymer

ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT

MF (C5 H8 O2)x

CI PMS, COM

CM 1



\*\*PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT\*\*

L2 4 ANSWERS REGISTRY COPYRIGHT 2007 ACS on STN

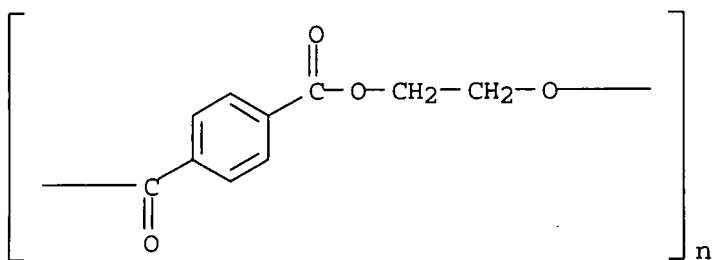
IN Poly(oxy-1,2-ethanediylloxycarbonyl-1,4-phenylenecarbonyl)

ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT

MF (C10 H8 O4)n

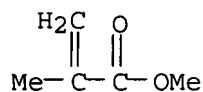
CI PMS, COM

\*\*RELATED POLYMERS AVAILABLE WITH POLYLINK\*\*



\*\*PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT\*\*

L2 4 ANSWERS REGISTRY COPYRIGHT 2007 ACS on STN  
 IN 2-Propenoic acid, 2-methyl-, methyl ester  
 MF C5 H8 O2  
 CI COM



\*\*PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT\*\*

ALL ANSWERS HAVE BEEN SCANNED

=>

*Structure Search*

=> file reg

FILE 'REGISTRY' ENTERED AT 11:51:56 ON 11 JUL 2007

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Property values tagged with IC are from the ZIC/VINITI data file provided by InfoChem.

STRUCTURE FILE UPDATES: 10 JUL 2007 HIGHEST RN 942116-98-5

DICTIONARY FILE UPDATES: 10 JUL 2007 HIGHEST RN 942116-98-5

New CAS Information Use Policies, enter HELP USAGETERMS for details.

TSCA INFORMATION NOW CURRENT THROUGH December 2, 2006

Please note that search-term pricing does apply when conducting SmartSELECT searches.

REGISTRY includes numerically searchable data for experimental and predicted properties as well as tags indicating availability of experimental property data in the original document. For information on property searching in REGISTRY, refer to:

<http://www.cas.org/support/stngen/stndoc/properties.html>

=> fil hcapl

FILE 'HCAPLUS' ENTERED AT 11:52:03 ON 11 JUL 2007

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FILE COVERS 1907 - 11 Jul 2007 VOL 147 ISS 3

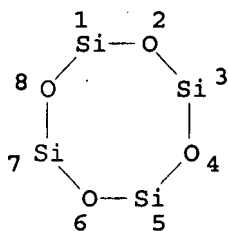
FILE LAST UPDATED: 10 Jul 2007 (20070710/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d que 136

L3 STR

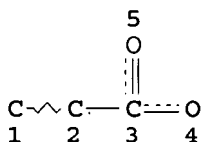


*9,434 structures from query*

NODE ATTRIBUTES:  
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 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
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 NUMBER OF NODES IS 8

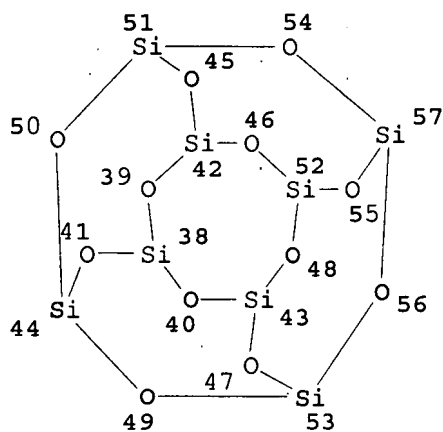
STEREO ATTRIBUTES: NONE  
 L5 9434 SEA FILE=REGISTRY SSS FUL L3  
 L8 STR



NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
 RING(S) ARE ISOLATED OR EMBEDDED  
 NUMBER OF NODES IS 5

STEREO ATTRIBUTES: NONE  
 L11 STR



NODE ATTRIBUTES:  
 DEFAULT MLEVEL IS ATOM  
 DEFAULT ECLEVEL IS LIMITED

*subset search with*

*and*

*361 structures*

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 20

STEREO ATTRIBUTES: NONE

L19 361 SEA FILE=REGISTRY SUB=L5 SSS FUL L8 AND L11  
L20 195 SEA FILE=HCAPLUS ABB=ON L19  
L21 1 SEA FILE=HCAPLUS ABB=ON L20 AND (MICRO(W)FLUID? OR MICROFLUID?)  
L22 125 SEA FILE=HCAPLUS ABB=ON L20(L)PREP/RL  
L23 1 SEA FILE=HCAPLUS ABB=ON L22 AND TUNING  
L24 1 SEA FILE=HCAPLUS ABB=ON L19 AND TUNING  
L25 2 SEA FILE=HCAPLUS ABB=ON L21 OR L23 OR L24  
L26 49 SEA FILE=REGISTRY ABB=ON 2 7080.1.1/RID  
L28 41 SEA FILE=HCAPLUS ABB=ON L26  
L29 2 SEA FILE=HCAPLUS ABB=ON L28 AND ?ACRYL?  
L30 32 SEA FILE=HCAPLUS ABB=ON L28(L)PREP/RL  
L31 4 SEA FILE=HCAPLUS ABB=ON L25 OR L29  
L33 4 SEA FILE=HCAPLUS ABB=ON L30 AND HYBRID?  
L34 1 SEA FILE=HCAPLUS ABB=ON L30 AND TUN?  
L35 7 SEA FILE=HCAPLUS ABB=ON L20 AND TUN?  
L36 15 SEA FILE=HCAPLUS ABB=ON L31 OR L33 OR L34 OR L35

=> d l36 bib abs ind.hitstr 1-15

L36 ANSWER 1 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2007:372006 HCAPLUS  
DN 146:501822  
TI Filled polysilsesquioxanes: a new approach to chemical sensing  
AU Castaldo, Anna; Massera, Ettore; Quercia, Luigi; Di Francia, Girolamo  
CS ENEA Research Center of Portici UTS Mat-Nano, Granatello Portici, Italy  
SO Macromolecular Symposia (2007), 247(Times of Polymers and Composites), 350-356  
CODEN: MSYMEC; ISSN: 1022-1360  
PB Wiley-VCH Verlag GmbH & Co. KGaA  
DT Journal  
LA English  
AB In an attempt to investigate new polymeric materials as constituents of an e-nose we focus our attention on a new emerging class of versatile three-dimensional polyhedral silicon polymers, called polysilsesquioxanes, containing nanosized inorg. cages. Such hybrid amphiphilic materials offer exceptional opportunities to create composites with singular properties. In particular we found that the polyhedral organosilsesquioxane (POSS) cages covalently attached to the polymer backbone as side-chain act as an "internal" filler with a nanometric homogeneous dispersion. We show how it is possible to fabricate sensing devices based on selected POSS matrix and, by a suitable choice of other "external" home-made fillers, (e.g. graphite, copper, silicon, zinc and their alloys) obtained by mech. milling the response of the resulting composites towards different classes of compds. can be tuned. In particular we fabricated a new high sensitive relative humidity device, exhibiting a fivefold response change for relative humidity changing in the range 0% to 100%. This behavior can not be modelled on the basis of the matrix swelling operating mechanism. Rather, the combined effect of the matrix and the filler has to be invoked in order to explain the formation of nanopores inside the material that are responsible of the porous behavior of our sensors.  
CC 37-6 (Plastics Manufacture and Processing)  
ST filled polysilsesquioxanes approach chem sensing graphite copper silicon zinc



IT Nanoparticles  
 (filler; nanoparticles filled polysilsesquioxanes for to chemical sensing)

IT Fillers  
 Polymer morphology  
 Sensors  
 (nanoparticles filled polysilsesquioxanes for to chemical sensing)

IT Silsesquioxanes  
 RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (nanoparticles filled polysilsesquioxanes for to chemical sensing)

IT 7440-66-6, Zinc, uses 7782-42-5, Graphite, uses 59873-66-4,  
 Copper-Graphite 69704-06-9, Zinc Graphite  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (conductive filler; nanoparticles filled polysilsesquioxanes for to chemical sensing)

IT 37382-33-5, Graphite silicide  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (filler; nanoparticles filled polysilsesquioxanes for to chemical sensing)

IT 7440-21-3, Silicon, uses 7440-50-8, Copper, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nanoparticles filled polysilsesquioxanes for to chemical sensing)

IT 936563-85-8  
 RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (nanoparticles filled polysilsesquioxanes for to chemical sensing)

IT 936563-85-8  
 RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (nanoparticles filled polysilsesquioxanes for to chemical sensing)

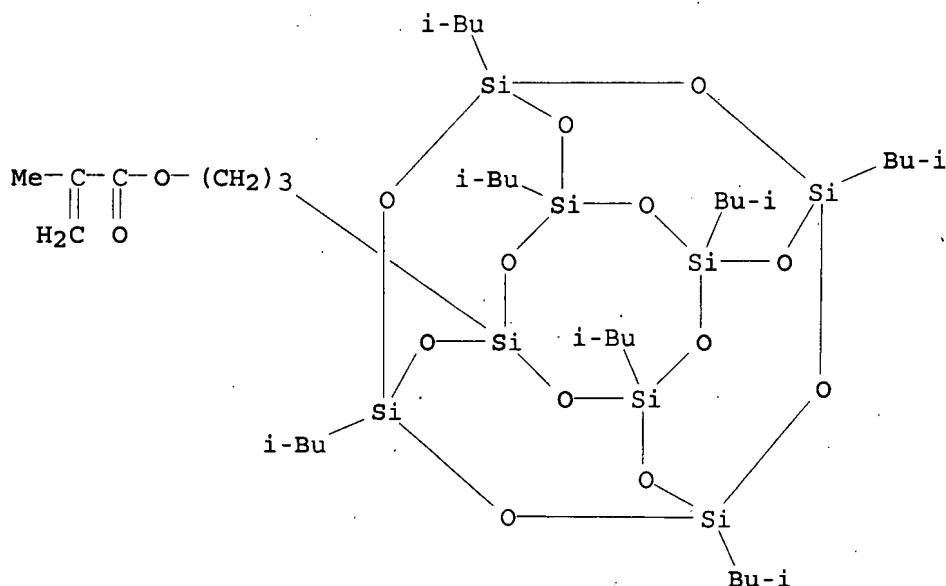
RN 936563-85-8 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, butyl ester, polymer with  
 3-[3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl]propyl 2-methyl-2-propenoate (CA INDEX NAME)

CM 1

CRN 307531-94-8

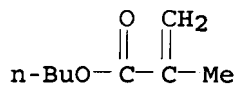
CMF C35 H74 O14 Si8



CM 2

CRN 97-88-1

CMF C8 H14 O2



RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

- L36 ANSWER 2 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2007:273459 HCAPLUS  
DN 146:482346  
TI Plasma Surface Modification and Characterization of POSS-Based Nanocomposite Polymeric Thin Films  
AU Augustine, Brian H.; Hughes, Wm. Christopher; Zimmermann, Kathryn J.; Figueiredo, Ashley J.; Guo, Xiaowen; Chusuei, Charles C.; Maidment, Jessica S.  
CS Department of Chemistry MSC 4501 and Department of Physics, James Madison University, Harrisonburg, VA, 22807, USA  
SO Langmuir (2007), 23(8), 4346-4350  
CODEN: LANGD5; ISSN: 0743-7463  
PB American Chemical Society  
DT Journal  
LA English  
AB The effect of a remote oxygen plasma on nanocomposite hybrid polymer thin films of poly[(propylmethacryl-hepta-isobutyl-polyhedral oligomeric silsesquioxane)-co-(Me methacrylate)] (POSS-MA) has been examined by advancing contact angle, XPS, and variable-angle spectroscopic ellipsometry (VASE). Exposure to a 25 W remote oxygen-containing plasma was found to convert the surface of POSS-MA films from hydrophobic to

hydrophilic within 20 s. The exposure time needed for this conversion to occur decreased as the O<sub>2</sub>/N<sub>2</sub> ratio in the plasma environment increased, indicating a pos. correlation between the hydrophilicity and the presence of oxygen in the plasma. Local bonding information inferred from high-resolution XPS data showed that the iso-Bu bonding to the POSS moiety is replaced with oxygen as a result of plasma exposure. Finally, VASE data demonstrates that increasing the weight percent of POSS in the copolymer significantly impedes the oxygen plasma degradation of POSS-MA films. On the basis of these results, a model is presented in which the oxygen plasma removes iso-Bu groups from the POSS cages and leaves a SiO<sub>2</sub>-like surface that is correspondingly more hydrophilic than the surface of the untreated samples and is more resistant to oxidation by the plasma. The ability to modify surfaces in this manner may impact the utility of this material for biomedical applications such as microfluidic devices in which the ability to control surface chemical is critical

CC 35-8 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 36

ST silsesquioxane deriv methyl methacrylate copolymer surface property plasma  
IT Thickness

(film; plasma surface modification and characterization of POSS-based nanocomposite polymeric thin films).

IT Silsesquioxanes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
(methacrylate-; plasma surface modification and characterization of POSS-based nanocomposite polymeric thin films)

IT Contact angle

Films

Hybrid organic-inorganic materials

Plasma

Surface composition

Surface treatment

X-ray photoelectron spectroscopy

(plasma surface modification and characterization of POSS-based nanocomposite polymeric thin films)

IT Coating process

(spin; plasma surface modification and characterization of POSS-based nanocomposite polymeric thin films)

IT 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen, uses

RL: NUU (Other use, unclassified); USES (Uses)

(plasma surface modification and characterization of POSS-based nanocomposite polymeric thin films)

IT 425409-07-0P

RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
(plasma surface modification and characterization of POSS-based nanocomposite polymeric thin films)

IT 425409-07-0P

RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
(plasma surface modification and characterization of POSS-based nanocomposite polymeric thin films)

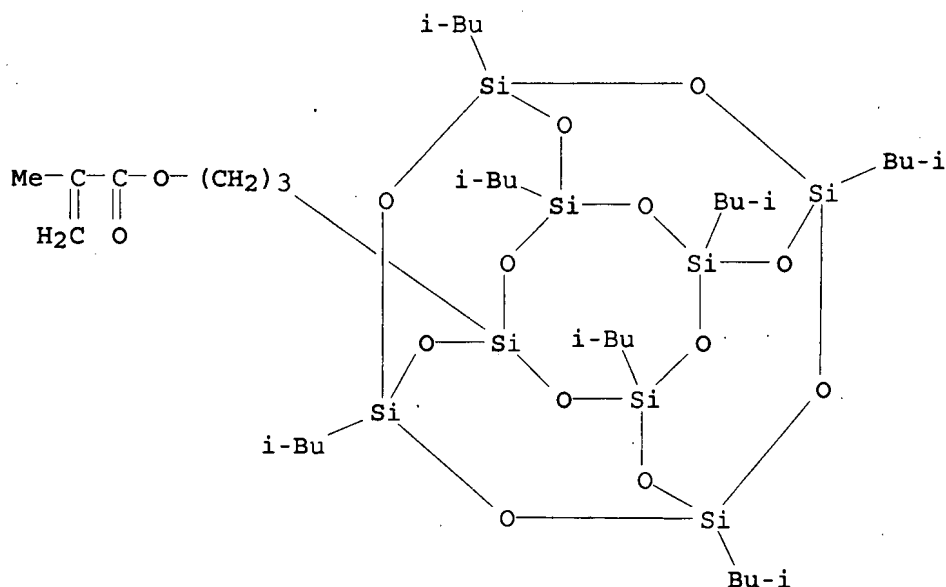
RN 425409-07-0 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl]propyl ester, polymer with methyl 2-methyl-2-propenoate (CA INDEX NAME)

CM 1

CRN 307531-94-8

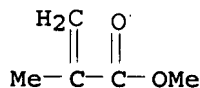
CMF C35 H74 O14 Si8



CM 2

CRN 80-62-6

CMF C5 H8 O2



RE.CNT 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

- L36 ANSWER 3 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2006:1268071 HCAPLUS  
DN 146:163221  
TI Understanding the reactivity of [W:NAr(CH<sub>2</sub>tBu)<sub>2</sub>(:CHtBu)] (Ar =  
2,6-iPrC<sub>6</sub>H<sub>3</sub>) with silica partially dehydroxylated at low temperatures  
through a combined use of molecular and surface organometallic chemistry  
AU Rhers, Bouchra; Quadrelli, Elsje Alessandra; Baudouin, Anne; Taoufik,  
Mostafa; Coperet, Christophe; Lefebvre, Frederic; Basset, Jean-Marie;  
Fenet, Bernard; Sinha, Amritanshu; Schrock, Richard R.  
CS Laboratoire de Chimie Organometallique de Surface (UMR 9986 CNRS/ENSCE  
Lyon) 43, Villeurbanne, F-69616, Fr.  
SO Journal of Organometallic Chemistry (2006), 691(24-25), 5448-5455  
CODEN: JORCAI; ISSN: 0022-328X  
PB Elsevier Ltd.  
DT Journal  
LA English  
AB Reaction of [W:NAr(CH<sub>2</sub>tBu)<sub>2</sub>(:CHtBu)] (Ar = 2,6-iPrC<sub>6</sub>H<sub>3</sub>) with silica  
partially dehydroxylated at 200° does not lead only to the expected  
bisgrafted [(tBu)2W:NAr(:CHtBu)] species, but also surface

reaction intermediates such as  $[(\text{.t} \text{p} \text{l} \text{b} \text{o} \text{n} \text{d} \text{.SiO})_2 \text{W:NAr}(\text{CH}_2 \text{tBu})_2]$ . All these species were characterized by IR spectroscopy, 1D and 2D solid state NMR, elemental anal. and mol. models obtained by using silsesquioxanes. While a mixture of several surface species, the resulting material displays high activity in the olefin metathesis.

CC 29-11 (Organometallic and Organometalloidal Compounds)

Section cross-reference(s): 66

ST tungsten imine alkylidene surface reaction partially dehydroxylated silica NMR

IT IR spectra

Molecular modeling

Surface reaction

(NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT Silsesquioxanes

RL: RCT (Reactant); RACT (Reactant or reagent)

(NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT Alkenes, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(metathesis model; NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT Metathesis

(olefin; model; NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT NMR (nuclear magnetic resonance)

(solid-state; NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT 7631-86-9D, Silica, partially dehydroxylated 128951-56-4 216972-58-6 329897-28-1 905703-18-6

RL: RCT (Reactant); RACT (Reactant or reagent)

(NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT 919991-99-4P 919992-01-1P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP

(Preparation); RACT (Reactant or reagent)

(NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT 128951-56-4DP, silica modified 905703-17-5P 919992-03-3P

RL: SPN (Synthetic preparation); PREP (Preparation)

(NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

IT 919991-99-4P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP

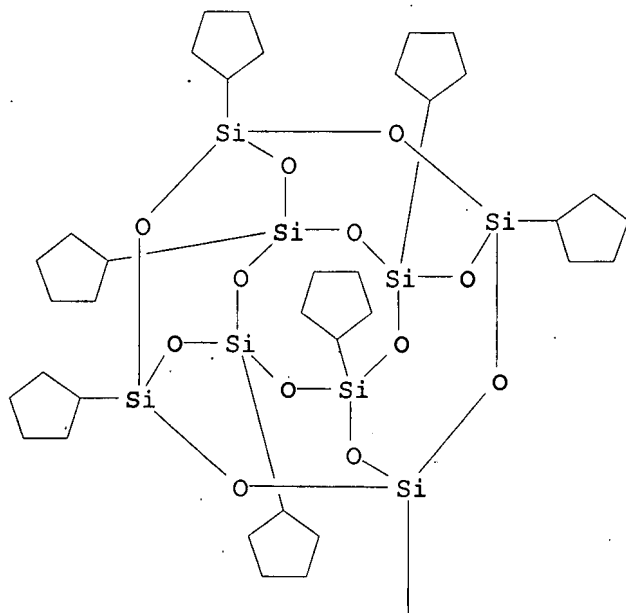
(Preparation); RACT (Reactant or reagent)

(NMR study of understanding the reactivity of imine tungsten alkylidene with partially dehydroxylated silica at low temps. through combined of mol. and surface organometallic chemical)

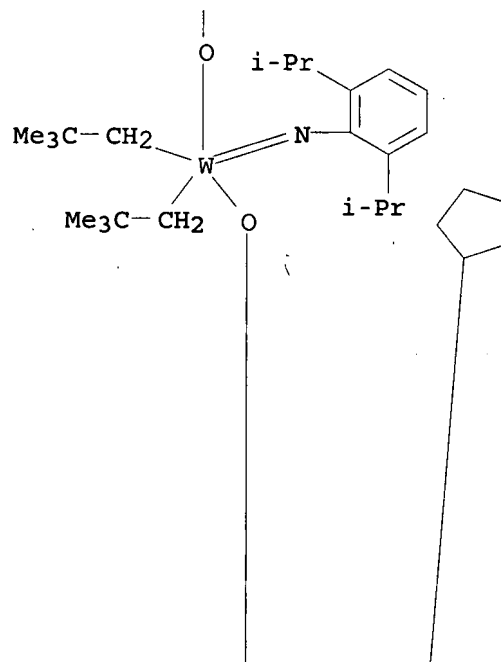
RN 919991-99-4 HCAPLUS

CN Tungsten, [2,6-bis(1-methylethyl)benzenaminato(2-)]bis(2,2-dimethylpropyl)bis(3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-olato- $\kappa$ O1)-, (SP-5-21)- (CA INDEX NAME)

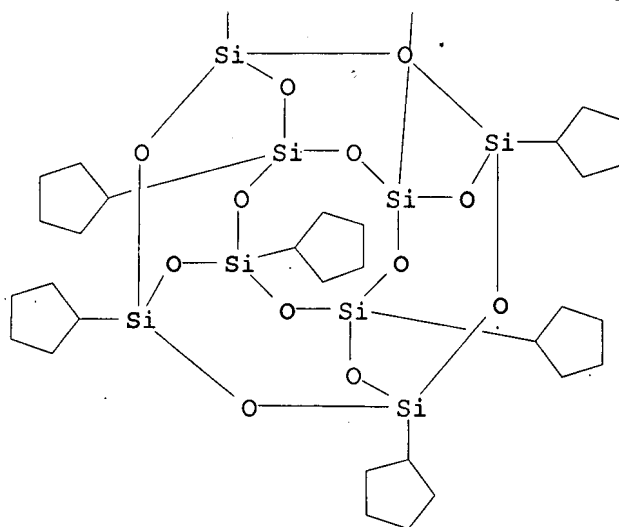
PAGE 1-A



PAGE 2-A



PAGE 3-A



RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 4 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:879292 HCAPLUS

DN 146:523461

TI Development of pressure sensitive paints based on silicon nanostructured powders

AU Castaldo, A.; Massera, E.; Quercia, L.; Di Francia, G.

CS Centro Ricerche di Portici, ENEA, 80055 NA, Italy

SO Sensors and Actuators, B: Chemical (2006), B118(1-2), 328-332

CODEN: SABCEB; ISSN: 0925-4005

PB Elsevier B.V.

DT Journal

LA English

AB A new pressure sensitive paint (PSP) family, based on silicon nanostructured powders as luminophore, has been developed for application in stationary wind tunnel test and potential advanced turbomachinery purposes. The pressure sensitive paint operates on its photoluminescence quenching when the nanostructured powder is exposed to an oxygen rich environment. Nanostructured powders, obtained with a combined ball milling-chemical etching process, are synthesized and deposited onto an appropriate polysilsesquioxane matrix, so that our paint can be adjusted for different pressure measurement applications. The formulation we propose is the first example of a PSP composite in which the filler acts as sensible element and it is localized over the polymeric film, reducing the response time due to oxygen variation to only a few seconds (0.5 ÷ 5 s).

CC 42-10 (Coatings, Inks, and Related Products)

ST silicon nanostructured powder pressure sensitive paint

IT Luminescence

Luminescence quenching

Paints

Polymer morphology

(pressure sensitive paints based on silicon nanostructured powders)

IT Silsesquioxanes

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(pressure sensitive paints based on silicon nanostructured powders)

IT 936563-85-8

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(pressure sensitive paints based on silicon nanostructured powders)

IT 936563-85-8

RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(pressure sensitive paints based on silicon nanostructured powders)

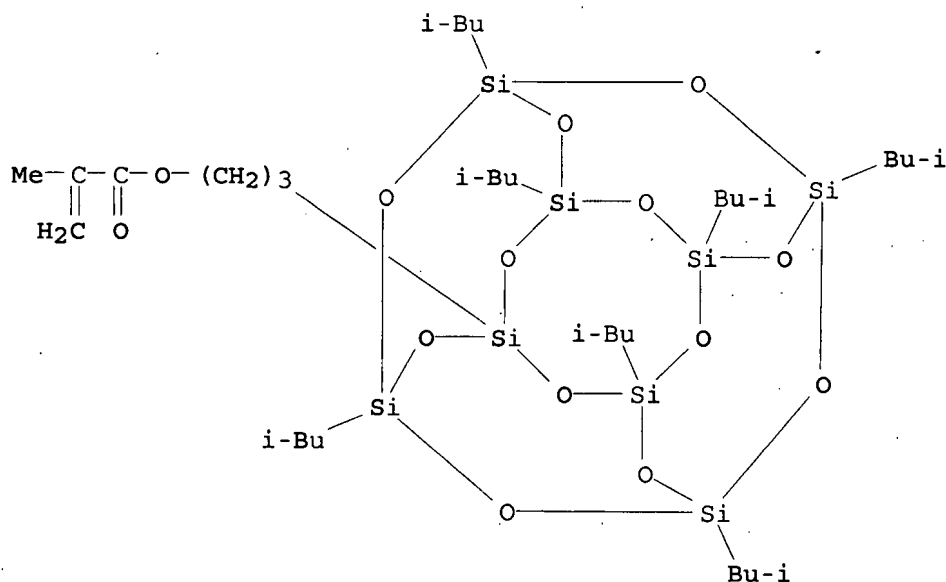
RN 936563-85-8 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, butyl ester, polymer with  
3-[3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl]propyl 2-methyl-2-propenoate (CA INDEX NAME)

CM 1

CRN 307531-94-8

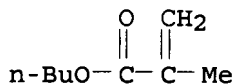
CMF C35 H74 O14 Si8



CM 2

CRN 97-88-1

CMF C8 H14 O2



RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT



L36 ANSWER 5 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:617113 HCAPLUS

DN 146:296543

TI Ultra-low-.vepsiln. nanocomposites of novel fluorinated polyimides grafted with polyhedral oligomeric silsesquioxane

AU Wang, Xiao-Feng; Chen, Yi-Wang

CS School of Materials Science and Engineering, Nanchang University, Nanchang, 330047, Peop. Rep. China

SO Yingyong Huaxue (2006), 23(5), 484-488

CODEN: YIHUED; ISSN: 1000-0518

PB Kexue Chubanshe

DT Journal

LA Chinese

AB Nanocomposites of 6F-Durene with covalently grafted polymethacrylate(PMA) side chains containing polyhedral oligomeric silsesquioxane (R7R'Si8O12 or POSS) units were prepared by means of the thermally-initiated free-radical graft polymerization of methacrylcyclopentyl-POSS (MA-POSS) with ozone-pretreated 6F-Durene. The chemical composition and the structure of the

6F-Durene with grafted methacrylcyclopentyl-POSS side chains(POSS/6F-Durene copolymers) were characterized by NMR, x-ray diffraction (XRD), and field-emission SEM (FESEM). The POSS/6F-Durene nanocomposite films had both lower and tunable dielec. consts. (.vepsiln.'s) in comparison with the pristine 6F-Durene films, with values between 2.0 and 2.5.

CC 37-3 (Plastics Manufacture and Processing)

Section cross-reference(s): 76

ST fluorinated polyimides grafted polyhedral oligomeric silsesquioxane

IT Polyimides, preparation

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (fluorine-containing, reaction products; ultra-low-.vepsiln. nanocomposites of fluorinated polyimides grafted with polyhedral oligomeric silsesquioxane)

IT Fluoropolymers, preparation

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polyimide-, reaction products; ultra-low-.vepsiln. nanocomposites of fluorinated polyimides grafted with polyhedral oligomeric silsesquioxane)

IT Dielectric constant

Glass transition temperature

Polymer morphology

(ultra-low-.vepsiln. nanocomposites of fluorinated polyimides grafted with polyhedral oligomeric silsesquioxane)

IT 928028-21-1P

RL: SPN (Synthetic preparation); PREP (Preparation) (ultra-low-.vepsiln. nanocomposites of fluorinated polyimides grafted with polyhedral oligomeric silsesquioxane)

IT 928028-21-1P

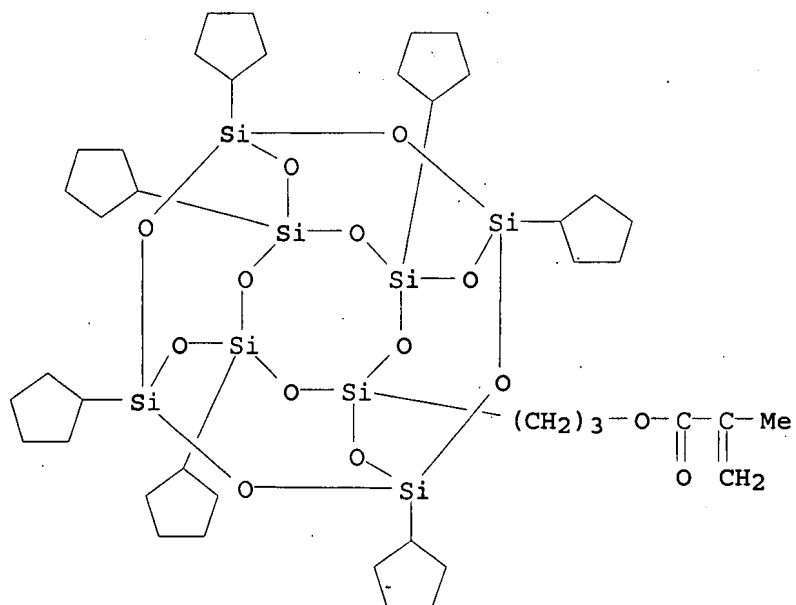
RL: SPN (Synthetic preparation); PREP (Preparation) (ultra-low-.vepsiln. nanocomposites of fluorinated polyimides grafted with polyhedral oligomeric silsesquioxane)

RN 928028-21-1 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl)propyl ester, polymer with 2,3,5,6-tetramethyl-1,4-benzenediamine and 5,5'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[1,3-isobenzofurandione], graft (CA INDEX NAME)

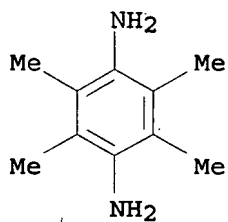
CM 1

CRN 169391-91-7  
CMF C42 H74 O14 Si8



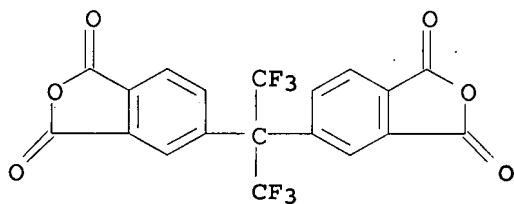
CM 2

CRN 3102-87-2  
CMF C10 H16 N2



CM 3

CRN 1107-00-2  
CMF C19 H6 F6 O6



L36 ANSWER 6 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:407280 HCAPLUS

DN 145:83954

TI Enhanced efficiency of polyfluorene derivatives: organic-inorganic hybrid polymer light-emitting diodes

AU Lee, Jonghee; Cho, Hoon-Je; Cho, Nam Sung; Hwang, Do-Hoon; Kang, Jong-Min; Lim, Eunhee; Lee, Jeong-Ik; Shim, Hong-Ku

CS Center for Advanced Functional Polymers, Department of Chemistry and School of Molecular Science (BK21), Korea Advanced Institute of Science and Technology, Daejeon, 305-701, S. Korea

SO Journal of Polymer Science, Part A: Polymer Chemistry (2006), 44(9), 2943-2954

CODEN: JPACEC; ISSN: 0887-624X

PB John Wiley & Sons, Inc.

DT Journal

LA English

AB Two novel organic-inorg. hybrid polyfluorene derivs., poly{(9,9'-dioctyl-2,7-fluorene)-co-(9,9'-di-POSS-2,7-fluorene)-co-[2,5-bis(octyloxy)-1,4-phenylene]} (PFDOPPOSS) and poly{(9,9'-dioctyl-2,7-fluorene)-co-(9,9'-di-POSS-2,7-fluorene)-co-bithiophene} (PFT2POSS), were synthesized by the Pd-catalyzed Suzuki reaction of polyhedral oligomeric silsesquioxane (POSS) appended fluorene, dioctyl phenylene, and bithiophene moieties. The synthesized polymers were characterized with <sup>1</sup>H NMR spectroscopy and elemental anal. Photoluminescence (PL) studies showed that the incorporation of the POSS pendant into the polyfluorene derivs. significantly enhanced the fluorescence quantum yields of the polymer films, likely via a reduction in the degree of interchain interaction as well as keto formation. Addnl., the blue-light-emitting polyfluorene derivative PFDOPPOSS showed high thermal color stability in PL. Moreover, single-layer light-emitting diode devices of an indium tin oxide/poly(3,4-ethylene dioxythiophene):poly(styrene sulfonate)/polymer/Ca/Al configuration fabricated with PFDOPPOSS and PFT2POSS showed much improved brightness, maximum luminescence intensity, and quantum efficiency in comparison with devices fabricated with the corresponding pristine polymers PFDOP and PFT2. In particular, the maximum external quantum efficiency of PFT2POSS was 0.13%, which was twice that of PFT2 (0.06%), and the maximum current efficiency of PFT2POSS was 0.38 cd/A, which again was twice that of PFT2 (0.19 cd/A).

CC 37-3 (Plastics Manufacture and Processing)

Section cross-reference(s): 36, 73, 76

ST octahedral silsesquioxane modification polyfluorene bithiophene fluorescence electroluminescence LED

IT Band gap

Electric current-potential relationship

Electroluminescent devices

Fluorescent substances

Hybrid organic-inorganic materials

Ionization potential

Luminescence, electroluminescence

Thermal stability

(octahedral silsesquioxane-modified polyfluorenes and bithiophene-containing polyfluorenes as organic-inorg. hybrid polymer light-emitting diodes)

IT 239075-02-6P 457931-26-9P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(monomer; octahedral silsesquioxane-modified polyfluorenes and bithiophene-containing polyfluorenes as organic-inorg. hybrid polymer light-emitting diodes)

IT 210347-56-1P 850648-80-5P 892142-65-3P 892142-66-4P  
 892142-67-5P 892142-68-6P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP  
 (Preparation)  
 (octahedral silsesquioxane-modified polyfluorenes and  
 bithiophene-containing polyfluorenes as organic-inorg. hybrid  
 polymer light-emitting diodes)

IT 111-83-1, 1-Bromooctane 123-31-9, Hydroquinone, reactions 4805-22-5  
 61676-62-8, 2-Isopropoxy-4,4,5,5-tetramethyl-1,3,2-dioxaborolane  
 145483-68-7  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (octahedral silsesquioxane-modified polyfluorenes and  
 bithiophene-containing polyfluorenes as organic-inorg. hybrid  
 polymer light-emitting diodes)

IT 67399-94-4P, 1,4-Dioctyloxybenzene  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (octahedral silsesquioxane-modified polyfluorenes and  
 bithiophene-containing polyfluorenes as organic-inorg. hybrid  
 polymer light-emitting diodes)

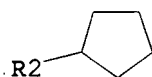
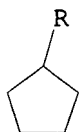
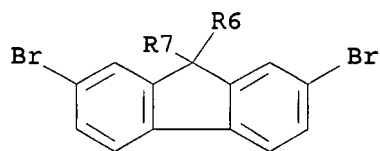
IT 892142-65-3P 892142-68-6P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP  
 (Preparation)  
 (octahedral silsesquioxane-modified polyfluorenes and  
 bithiophene-containing polyfluorenes as organic-inorg. hybrid  
 polymer light-emitting diodes)

RN 892142-65-3 HCAPLUS  
 CN 1,3,2-Dioxaborolane, 2,2'-[2,5-bis(octyloxy)-1,4-phenylene]bis[4,4,5,5-  
 tetramethyl-, polymer with 2,7-dibromo-9,9-dioctyl-9H-fluorene and  
 1,1'-[(2,7-dibromo-9H-fluoren-9-ylidene)bis[2,1-ethanediyl-3,1-  
 propanediyl(dimethylsilylene)oxy]]bis[3,5,7,9,11,13,15-  
 heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane] (9CI) (CA  
 INDEX NAME)

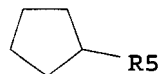
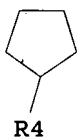
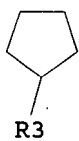
CM 1

CRN 807618-46-8  
 CMF C97 H164 Br2 O28 Si18

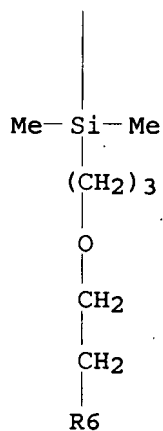
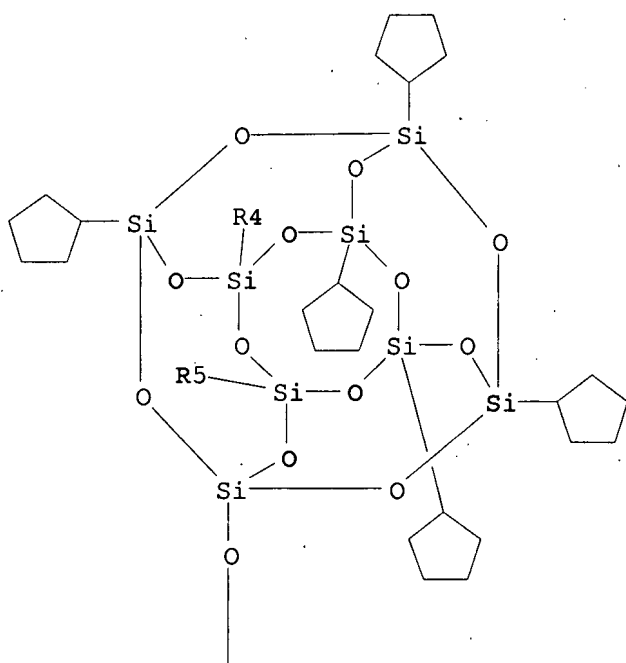
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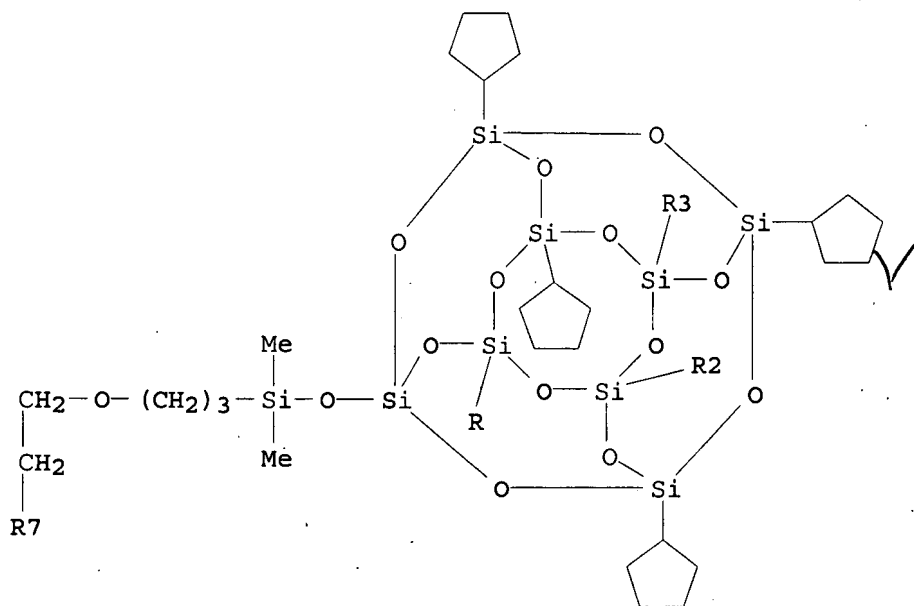
PAGE 3-A



PAGE 4-A

*see next  
page for  
2 Si-O rings*

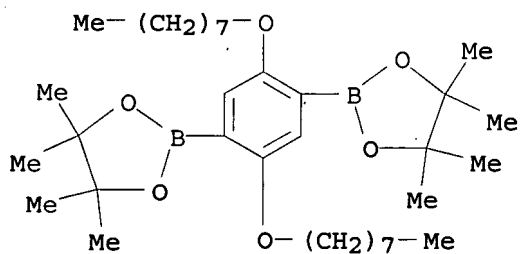
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CM 2

CRN 457931-26-9

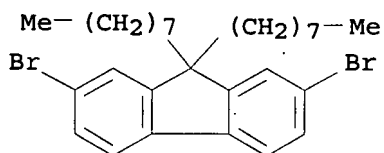
CMF C34 H60 B2 O6



CM 3

CRN 198964-46-4

CMF C29 H40 Br2



RN 892142-68-6 HCAPLUS

CN 1,3,2-Dioxaborolane, 2,2'-[2,2'-bithiophene]-5,5'-diylbis[4,4,5,5-

KATHLEEN FULLER EIC1700 571/272-2505

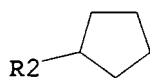
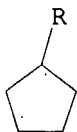
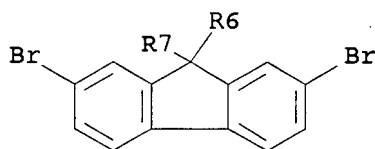
tetramethyl-, polymer with 2,7-dibromo-9,9-dioctyl-9H-fluorene and  
1,1'-[(2,7-dibromo-9H-fluoren-9-ylidene)bis[2,1-ethanediyoxy-3,1-  
propanediyl(dimethylsilylene)oxy]]bis[3,5,7,9,11,13,15-  
heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane] (9CI) (CA  
INDEX NAME)

CM 1

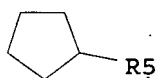
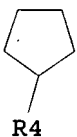
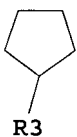
CRN 807618-46-8

CMF C97 H164 Br2 O28 Si18

PAGE 1-A

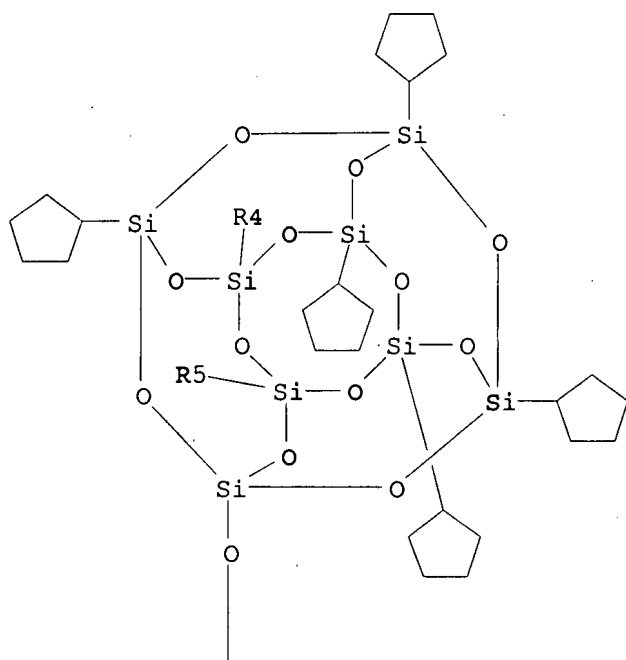


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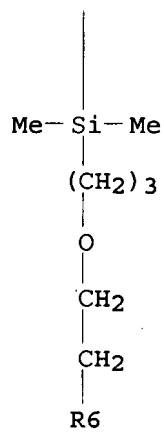


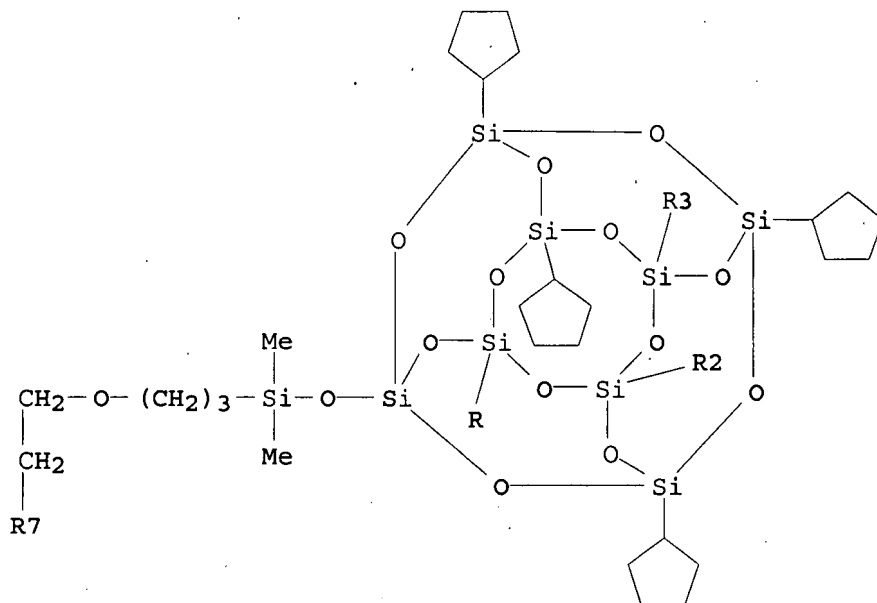


PAGE 3-A



PAGE 4-A

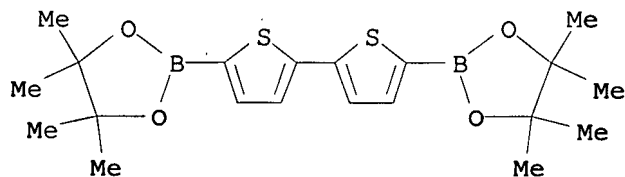




CM 2

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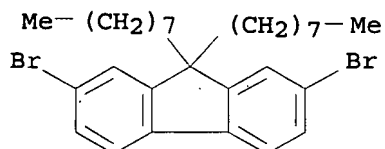
CMF C20 H28 B2 O4 S2



CM 3

CRN 198964-46-4

CMF C29 H40 Br2



RE.CNT 54 THERE ARE 54 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 7 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2006:233054 HCAPLUS

KATHLEEN FULLER EIC1700 571/272-2505

DN 144:451036

TI Synthesis, morphology and photophysics of novel **hybrid** organic-inorganic polyhedral oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s

AU Pu, Kan-Yi; Zhang, Bing; Ma, Zhun; Wang, Pei; Qi, Xiao-Ying; Chen, Run-Feng; Wang, Lian-Hui; Fan, Qu-Li; Huang, Wei

CS Institute of Advanced Materials (IAM), Fudan University, Shanghai, 200433, Peop. Rep. China

SO Polymer (2006), 47(6), 1970-1978

CODEN: POLMAG; ISSN: 0032-3861

PB Elsevier Ltd.

DT Journal

LA English

AB A series of novel **hybrid** organic-inorg. light-emitting materials, polyhedral oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s, were successfully synthesized via the Sonagashira coupling reaction. The chemical structures of these copolymers were determined by <sup>1</sup>H NMR and FTIR spectra. The morphologies of these copolymers were studied in detail using TEM and WAXD. The WAXD data showed that POSS formed small aggregates instead of crystals in the polymer matrix, indicating the significant effect of the backbone constraint on POSS crystallization. Furthermore, it also revealed that the interchain interaction weakened and the interchain distance increased after introducing POSS groups. The TEM data indicated that POSS aggregates were well dispersed in the polymer matrix. In accordance with the morphol. investigation, the results of UV-vis absorption and photoluminescence emission spectra of these copolymers showed that the tendency toward planar conformation of conjugated backbones was reduced to a certain extent due to weakened interchain interaction. Accordingly, these copolymers exhibited enhanced quantum yields in the solid state. In addition, owing to the thermal and oxygen stability of **hybrid** POSS, the thermal spectral stability of these polymers was also improved greatly.

CC 35-7 (Chemistry of Synthetic High Polymers)

ST pentacyclooctasiloxane deriv contg polyfluorenyleneethynylene

IT Polyacetylenes, preparation

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (cardo, pentacyclooctasiloxane group-containing; synthesis, morphol. and photophysics of **hybrid** organic-inorg. polyhedral oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s)

IT Cardo polymers

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polyacetylenes, pentacyclooctasiloxane group-containing; synthesis, morphol. and photophysics of **hybrid** organic-inorg. polyhedral oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s)

IT **Hybrid** organic-inorganic materials

Luminescence

Polymer morphology

UV and visible spectra

(synthesis, morphol. and photophysics of **hybrid** organic-inorg. polyhedral oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s)

IT 14348-75-5, 2,7-Dibromofluorenone 480438-19-5

RL: RCT (Reactant); RACT (Reactant or reagent)

(in preparation of monomer for synthesis of **hybrid** organic-inorg. polyhedral oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s)

IT 169169-89-5P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(in preparation of monomer for synthesis of **hybrid organic-inorg.**  
polyhedral oligomeric silsesquioxane-tethered  
poly(fluorenyleneethynylene)s)

IT 885947-40-0P

RL: RCT (Reactant); SPN (Synthetic preparation); **PREP**  
(**Preparation**); RACT (Reactant or reagent)

(monomer; for synthesis **hybrid organic-inorg.** polyhedral  
oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s)

IT 885947-43-3P

RL: PRP (Properties); SPN (Synthetic preparation); **PREP**  
(**Preparation**)

(synthesis, morphol. and photophysics of **hybrid organic-inorg.**  
polyhedral oligomeric silsesquioxane-tethered  
poly(fluorenyleneethynylene)s)

IT 885947-40-0P

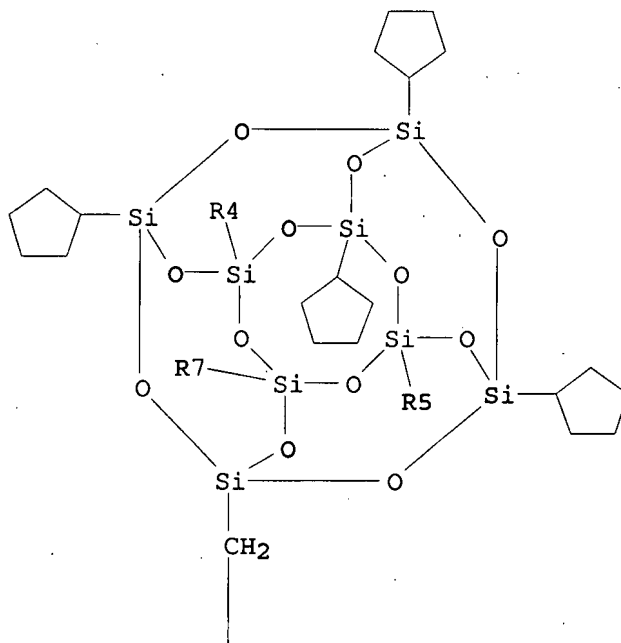
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP**  
(**Preparation**); RACT (Reactant or reagent)

(monomer; for synthesis **hybrid organic-inorg.** polyhedral  
oligomeric silsesquioxane-tethered poly(fluorenyleneethynylene)s)

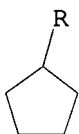
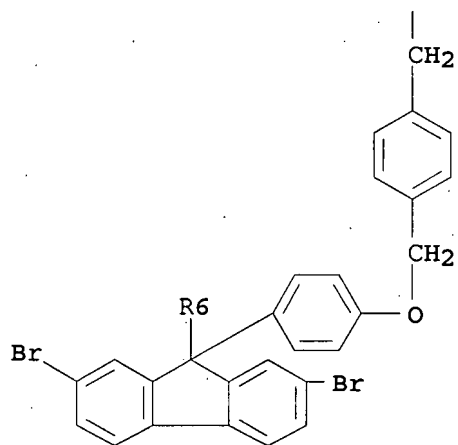
RN 885947-40-0 HCAPLUS

CN Pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane, 1,1'-[(2,7-dibromo-9H-  
fluoren-9-ylidene)bis(4,1-phenyleneoxymethylene-4,1-phenylene-2,1-  
ethanediyl)]bis[heptacyclopentyl- (9CI) (CA INDEX NAME)

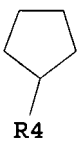
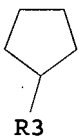
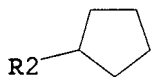
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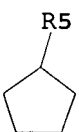
PAGE 2-A



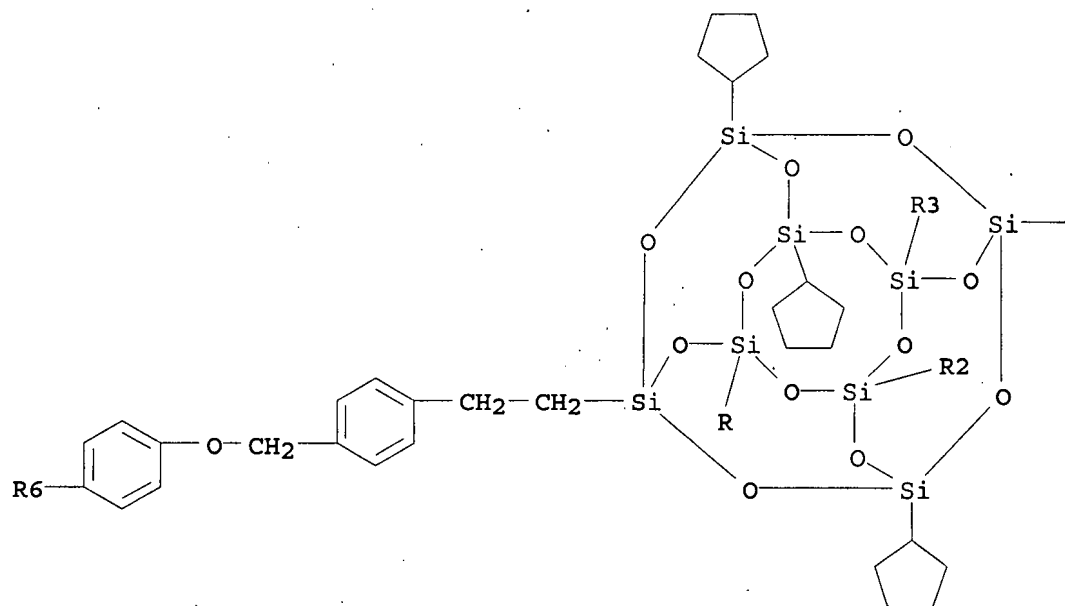
PAGE 3-A



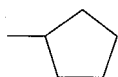
PAGE 4-A



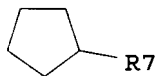
PAGE 5-A



PAGE 5-B



PAGE 6-A



IT 885947-43-3P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(synthesis, morphol. and photophysics of hybrid organic-inorg.  
polyhedral oligomeric silsesquioxane-tethered  
poly(fluorenyleneethynylene)s)

RN 885947-43-3 HCAPLUS

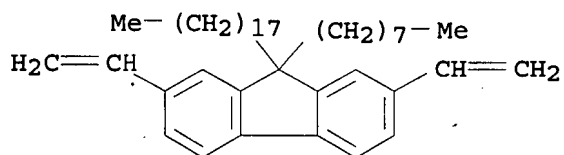
CN Pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane, 1,1'-[(2,7-dibromo-9H-  
fluoren-9-ylidene)bis(4,1-phenyleneoxymethylene-4,1-phenylene-2,1-

ethanediyl]]bis[3,5,7,9,11,13,15-heptacyclopentyl-, polymer with  
2,7-dibromo-9-octadecyl-9-octyl-9H-fluorene and 2,7-diethenyl-9-octadecyl-  
9-octyl-9H-fluorene (9CI) (CA INDEX NAME)

CM 1

CRN 885947-42-2

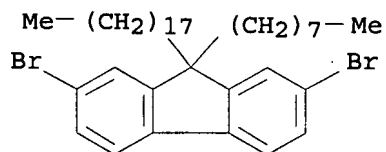
CMF C43 H66



CM 2

CRN 885947-41-1

CMF C39 H60 Br2

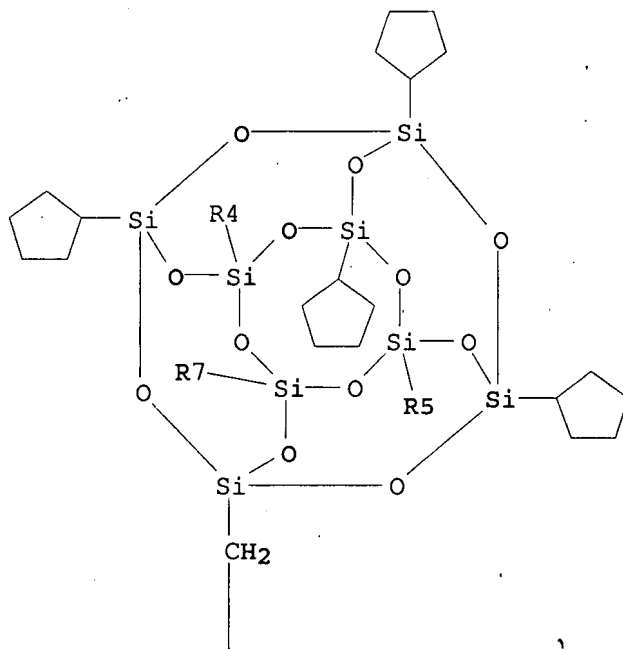


CM 3

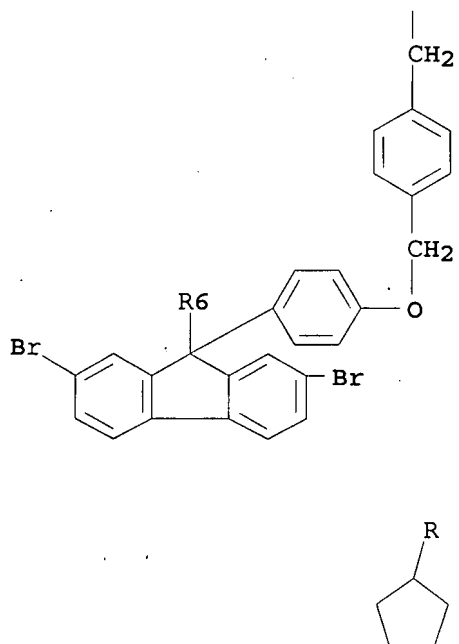
CRN 885947-40-0

CMF C113 H160 Br2 O26 Si16

PAGE 1-A

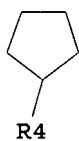
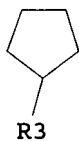
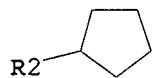


PAGE 2-A

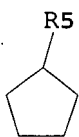




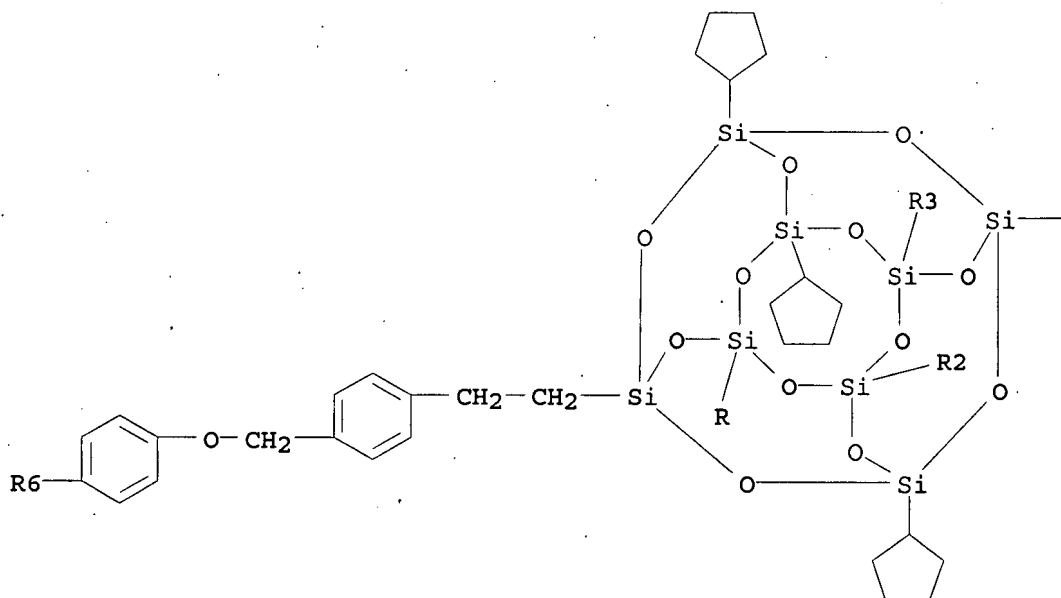
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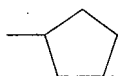
PAGE 4-A



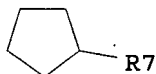
PAGE 5-A



PAGE 5-B



PAGE 6-A



RE.CNT 72 THERE ARE 72 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 8 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2006:145628 HCAPLUS  
DN 144:351846

TI Low- $\kappa$  nanocomposite films based on polyimides with grafted  
polyhedral oligomeric silsesquioxane

AU Chen, Yiwang; Chen, Lie; Nie, Huarong; Kang, E. T.

CS School of Materials Science and Engineering, Nanchang University,  
Nanchang, 330047, Peop. Rep. China

SO Journal of Applied Polymer Science (2006), 99(5), 2226-2232  
CODEN: JAPNAB; ISSN: 0021-8995

PB John Wiley & Sons, Inc.

DT Journal

LA English

AB Nanocomposites of polyimides (PI) with covalently grafted polyhedral  
oligomeric silsesquioxane (R7R'Si8O12 or POSS) units were prepared by  
thermally-initiated free-radical graft polymerization of methacrylcyclopentyl-  
POSS (MA-POSS) with the ozone-pretreated poly[N,N'-(1,4-phenylene)-  
3,3',4,4'-benzophenonetetracarboxylic amic acid] (PAA), followed by  
thermal imidization. The chemical composition and structure of the PI with  
grafted methacrylcyclopentyl-POSS side chains (PI-g-PMA-POSS copolymers)  
were characterized by NMR, x-ray diffraction (XRD), and thermogravimetric  
anal. (TGA). The POSS mols. in each grafted PMA side chain of the  
amorphous PI films retained the nanoporous crystalline structure, and formed an  
aggregate of crystallites. The PI-g-PMA-POSS nanocomposite films had both  
lower and tunable dielec. consts., in comparison with that of  
the pristine PI films. Dielec. consts. ( $\kappa$ 's) of about 3.0-2.2 were  
obtained. The present approach offers a convenient way for preparing  
low- $\kappa$  materials based on existing PI's.

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 76

ST low dielec nanocomposite film polyimide grafted polyhedral oligomeric  
silsesquioxane

IT Polymer morphology

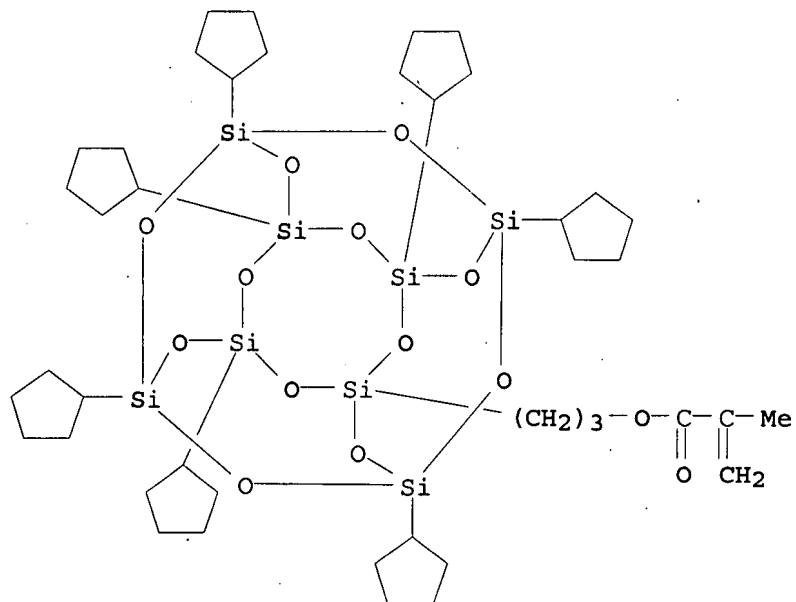
(fracture-surface; low- $\kappa$  nanocomposite films based on polyimides)

- with grafted polyhedral oligomeric silsesquioxane)
- IT Density
  - Dielectric constant
  - Electric insulators
  - Glass transition temperature
  - Nanocomposites
  - Plastic films
  - Porosity
    - (low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT Silsesquioxanes
  - RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
    - (polyamic acid-, acrylic, cardo, graft, intermediates; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT Silsesquioxanes
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
    - (polyimide-polyketone-, acrylic, cardo, graft; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT Polyketones
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
    - (polyimide-silsesquioxane-, acrylic, cardo, graft; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT Polyimides, properties
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
    - (polyketone-silsesquioxane-, acrylic, cardo, graft; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT Fracture surface morphology
  - (polymeric; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT Polyamic acids
  - RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
    - (silsesquioxane-, acrylic, cardo, graft, intermediates; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT 845508-91-0P
  - RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
    - (intermediate; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT 845508-91-0DP, imidized
  - RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
    - (low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- IT 845508-91-0P
  - RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
    - (intermediate; low- $\kappa$  nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)
- RN 845508-91-0 HCAPLUS
- CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with 1,4-benzenediamine and 5,5'-carbonylbis[1,3-isobenzofurandione], graft (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

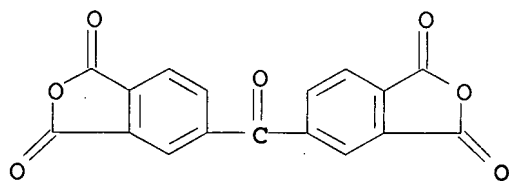
CMF C42 H74 O14 Si8



CM 2

CRN 2421-28-5

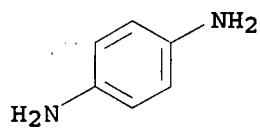
CMF C17 H6 O7



CM 3

CRN 106-50-3

CMF C6 H8 N2



IT 845508-91-ODP, imidized

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT

KATHLEEN FULLER EIC1700 571/272-2505

(Reactant or reagent)

(low-κ nanocomposite films based on polyimides with grafted polyhedral oligomeric silsesquioxane)

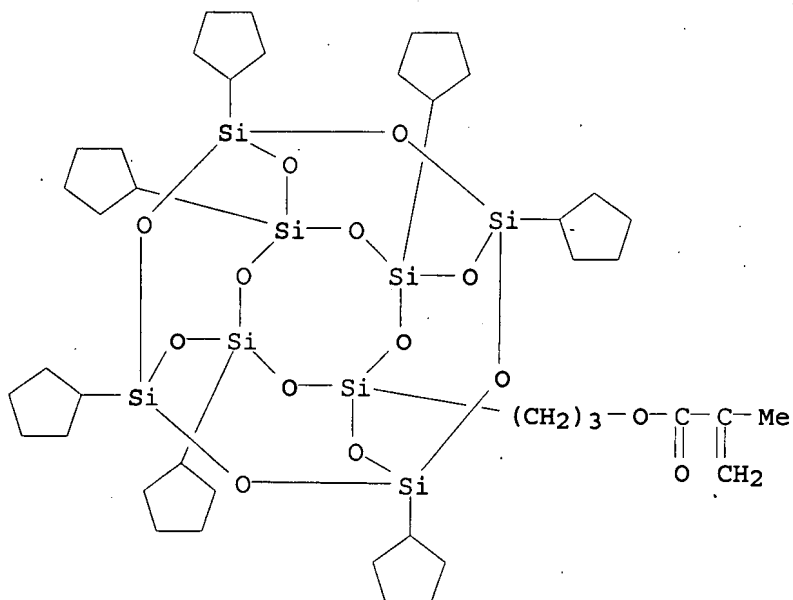
RN 845508-91-0 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with 1,4-benzenediamine and 5,5'-carbonylbis[1,3-isobenzofurandione], graft (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

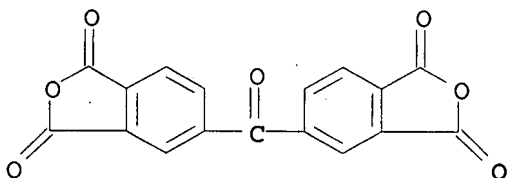
CMF C42 H74 O14 Si8



CM 2

CRN 2421-28-5

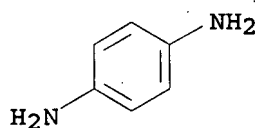
CMF C17 H6 O7



CM 3

CRN 106-50-3

CMF C6 H8 N2



RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 9 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:37677 HCAPLUS

DN 145:336914

TI Preparation of fluorinated polyimide/POSS nanocomposites with ultra-low dielectric constant by graft copolymerization

AU Chen, Yiwang; Nie, Huarong; Chen, Lie; Kang, En-Tang

CS School of Materials Science and Engineering, Nanchang University, Nanchang, 330047, Peop. Rep. China

SO Gaofenzi Xuebao (2005), (6), 807-812

CODEN: GAXUE9; ISSN: 1000-3304

PB Kexue Chubanshe

DT Journal

LA Chinese

AB Nanocomposites of fluorinated polyimides (FPI) with covalently grafted polymethacrylate side chains containing polyhedral oligomeric silsesquioxane (R7R'Si8O12 or POSS) units were prepared by thermally-initiated free-radical graft polymerization of methacrylcyclopentyl-POSS (MA-POSS) with the ozone-pretreated FPI. The chemical composition and structure of the FPI with grafted methacrylcyclopentyl-POSS side chains were characterized by NMR (1H-NMR) and X-ray diffraction (XRD). The morphol. of the POSS/FPI nanocomposite films was observed by field-emission SEM (FESEM) and transmission electron microscopy (TEM). A layer-by-layer structure was revealed, which supports the formation of an ordered architecture by POSS crystallites in the FPI matrix, as the result of self-assembled POSS units of MA-POSS side chains. The POSS/FPI nanocomposite films had both lower and tunable dielec. consts., in comparison with that of the pristine FPI films. Dielec. consts. (κ's) of about 2.5 to 2.1 were obtained. The reduction of dielec. constant was most likely due to a combined contribution of the nanoporosity of the POSS units and the external porosity introduced by the grafting of MA-POSS to the FPI chains.

CC 38-3 (Plastics Fabrication and Uses)

ST fluorinated polyimide POSS nanocomposite dielec const porosity glass temp

IT Polysulfones, uses

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses) (polyether-polyimide-, fluorine-containing; preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

IT Fluoropolymers, uses

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses) (polyether-polyimide-polysulfone-; preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

IT Polyimides, uses

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses) (polyether-polysulfone-, fluorine-containing; preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

IT Polyethers, uses

RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)

(polyimide-polysulfone-, fluorine-containing; preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

IT Density

Dielectric constant

Glass transition temperature

Nanocomposites

Porosity

(preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

IT 169391-91-7

RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)

(preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

IT 133028-98-5P 133029-66-0P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

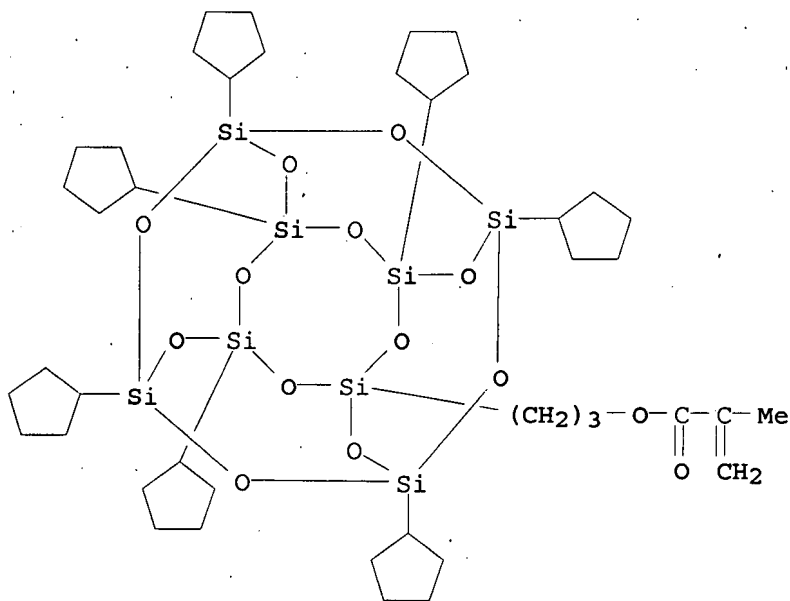
IT 169391-91-7

RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)

(preparation, d., porosity, and dielec. and thermal properties of fluorinated polyimide/POSS nanocomposites with ultra-low dielec. constant)

RN 169391-91-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)



L36 ANSWER 10 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:821929 HCAPLUS

DN 142:241025

TI New approach to nanocomposites of polyimides containing polyhedral oligomeric silsesquioxane for dielectric applications

KATHLEEN FULLER EIC1700 571/272-2505

- AU Chen, Yiwang; Kang, En-Tang  
 CS School of Material Science and Engineering, Nanchang University, Nanchang, 330047, Peop. Rep. China  
 SO Materials Letters (2004), 58(29), 3716-3719  
 CODEN: MLETDJ; ISSN: 0167-577X  
 PB Elsevier B.V.  
 DT Journal  
 LA English  
 AB Low dielec. constant nanocomposites of polyimides with grafted methacrylate side chains containing polyhedral oligomeric silsesquioxane (POSS) were successfully synthesized by thermally initiated free-radical graft copolymn. of methacrylcyclopentyl-POSS (MA-POSS) with the ozone-preactivated poly(amic acid), followed by thermal imidization. The dielec. constant of the film can be tuned by varying the molar ratio of the grafted MA-POSS side chains in the copolymer.
- CC 37-3 (Plastics Manufacture and Processing)  
 Section cross-reference(s): 76
- ST nanocomposites polyimide contg silsesquioxane dielec application
- IT Polymerization  
 (graft, radical; new approach to nanocomposites of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT Nanocomposites  
 (new approach to nanocomposites of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT Silsesquioxanes  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (new approach to nanocomposites of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT Polymer morphology  
 (of nanocomposites of polyimides containing polyhedral oligomeric silsesquioxane)
- IT Polyketones  
 RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation);  
 USES (Uses)  
 (polyamic acid-, as initiator; in preparation of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT Polyamic acids  
 RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation);  
 USES (Uses)  
 (polyketone-, as initiator; in preparation of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT Imidation  
 (thermal; in preparation of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT 845508-91-ODP, imidized  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (assumed and actual monomers; new approach to nanocomposites of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT 25038-83-9DP, 3,3',4,4'-Benzophenonedicarboxylic anhydride-1,4-phenylenediamine copolymer, reaction product with ozone  
 RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation);  
 USES (Uses)  
 (assumed monomers, as initiator; in preparation of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)
- IT 10028-15-6DP, Ozone, reaction product with poly[N,N'-(1,4-phenylene)-3,3',4,4'-benzophenonetetracarboxylic amic acid]  
 RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation);  
 USES (Uses)



(in preparation of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)

IT 51396-17-9DP, reaction product with ozone

RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(initiator; in preparation of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)

IT 845508-91-0DP, imidized

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(assumed and actual monomers; new approach to nanocomposites of polyimides containing polyhedral oligomeric silsesquioxane for dielec. applications)

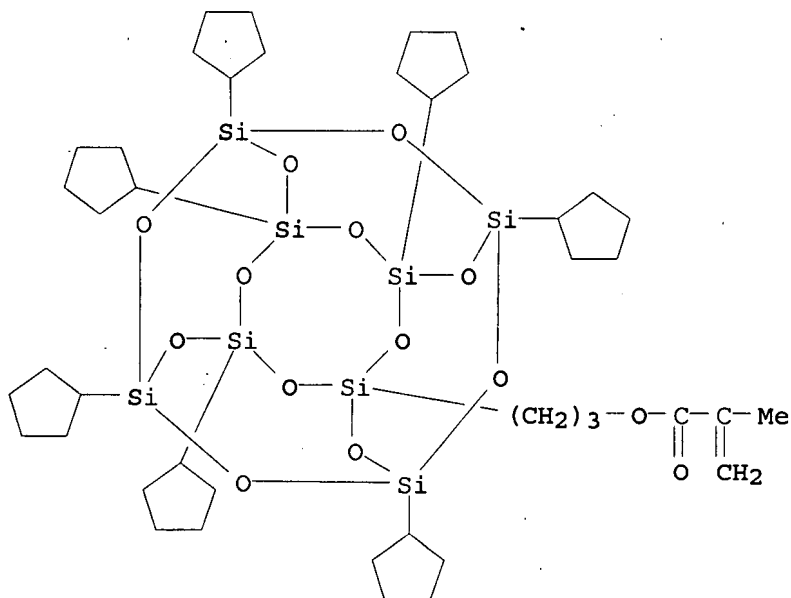
RN 845508-91-0 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with 1,4-benzenediamine and 5,5'-carbonylbis[1,3-isobenzofurandione], graft (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

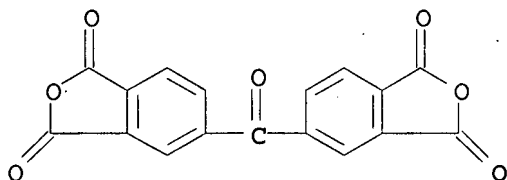
CMF C42 H74 O14 Si8



CM 2

CRN 2421-28-5

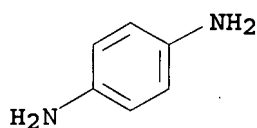
CMF C17 H6 O7



CM 3

CRN 106-50-3

CMF C6 H8 N2



RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 11 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:101211 HCAPLUS

DN 140:146684

TI Preparation and uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS)

IN Mather, Patrick T.; Kim, Byoung-Suhk; Ge, Qing; Liu, Changdeng

PA University of Connecticut, USA

SO PCT Int. Appl., 35 pp.

CODEN: PIXXD2

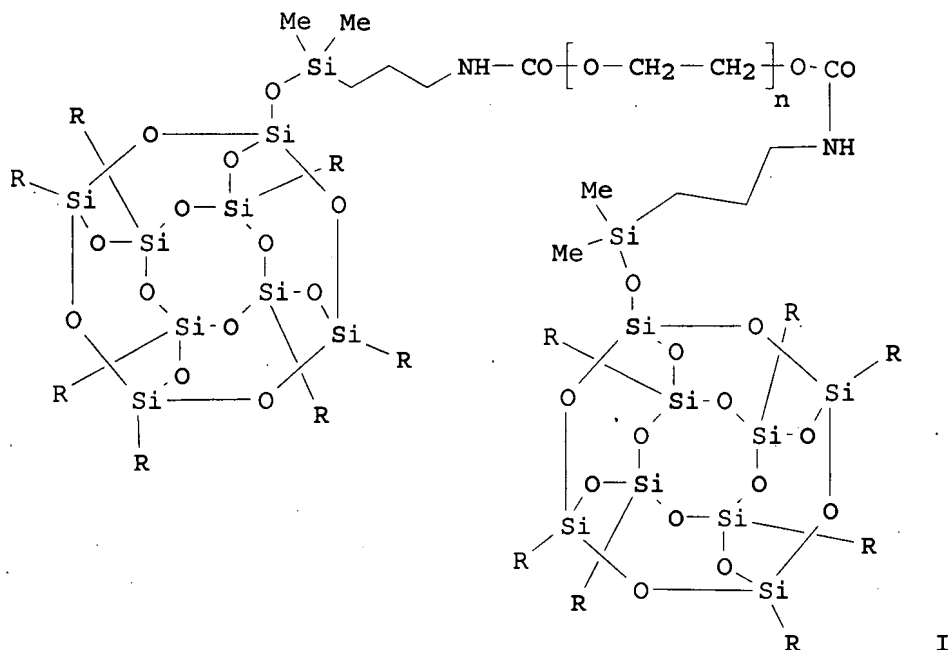
DT Patent

LA English

FAN.CNT 7

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004011525	A1	20040205	WO 2003-US22898	20030723
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	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 2004024098	A1	20040205	US 2003-620644	20030716
	US 7067606	B2	20060627		
	AU 2003254106	A1	20040216	AU 2003-254106	20030723
PRAI	US 2002-399599P	P	20020730		
	US 2003-620644	A	20030716		
	US 2003-488590P	P	20030718		
	WO 2003-US22898	W	20030723		

GI



AB Amphiphilic telechelics incorporating polyhedral oligosilsesquioxane (POSS) are synthesized by direct urethane linkage between the diol end groups of polyethylene glycol (PEG) homopolymers and the monoisocyanate group of POSS macromers, wherein the telechelic has a formula (I), wherein R is a cyclic hydrocarbon selected from the group of cyclohexyl, cyclopentyl, cyclooctyl, Me, Et, Pr, iso-Pr, Bu, iso-Bu, styryl, vinyl, allyl, ethylphenyl or any aryl, group selected from the group of Ph, biphenyl and naphthyl. The hydrophobicity of the amphiphilic telechelics can be varied by using PEG homopolymers of increasing MW, providing for control over mol. architecture by hydrophilic/hydrophobic balance. A method for synthesizing the amphiphilic telechelic comprises reacting PEG and POSS macromer wherein the monoisocyanate groups of two POSS macromer are directly linked between the diol end groups of PEG. The amphiphilic telechelics are useful as surfactants, thickening agents, additives to plastic such as PMMA (Plexiglass), epoxy adhesives for improved properties.

IC ICM C08G065-32

ICS C08G018-32

CC 35-8 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 37, 46, 52

ST polyoxyethylene isocyanato oligosilsesquioxane reaction product prepn property; isocyanatodimethylsilylcyclohexyl polyhedral oligosilsesquioxane prepn property use; amphiphilic polyether silsesquioxane telechelic; toughening agent polyether silsesquioxane

IT Surfactants

(amphiphilic, telechelic; uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))

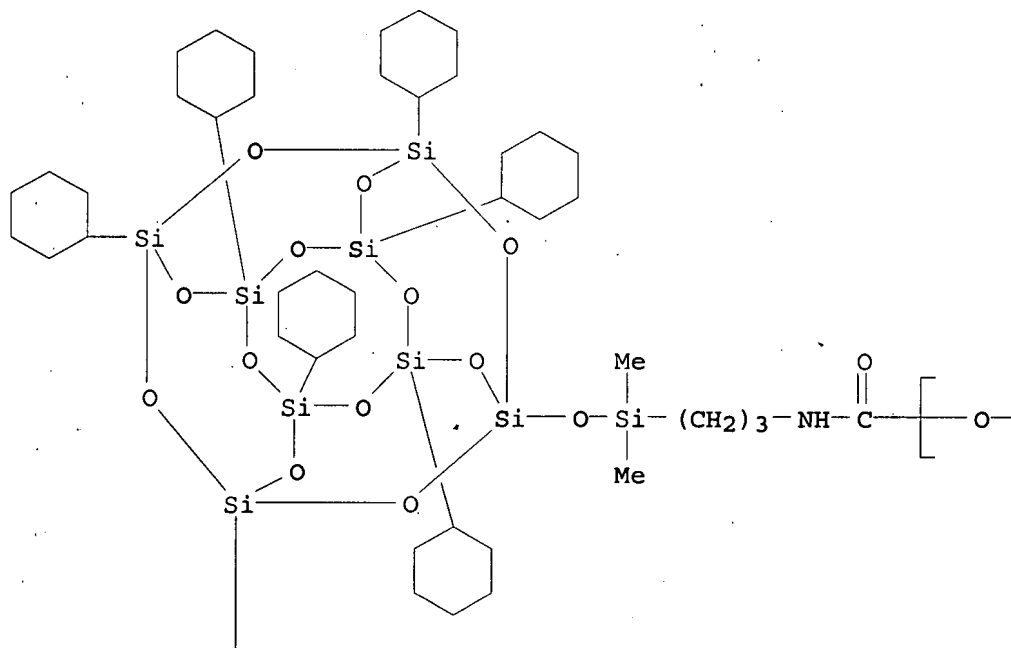
IT Silsesquioxanes

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polyether-; uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))

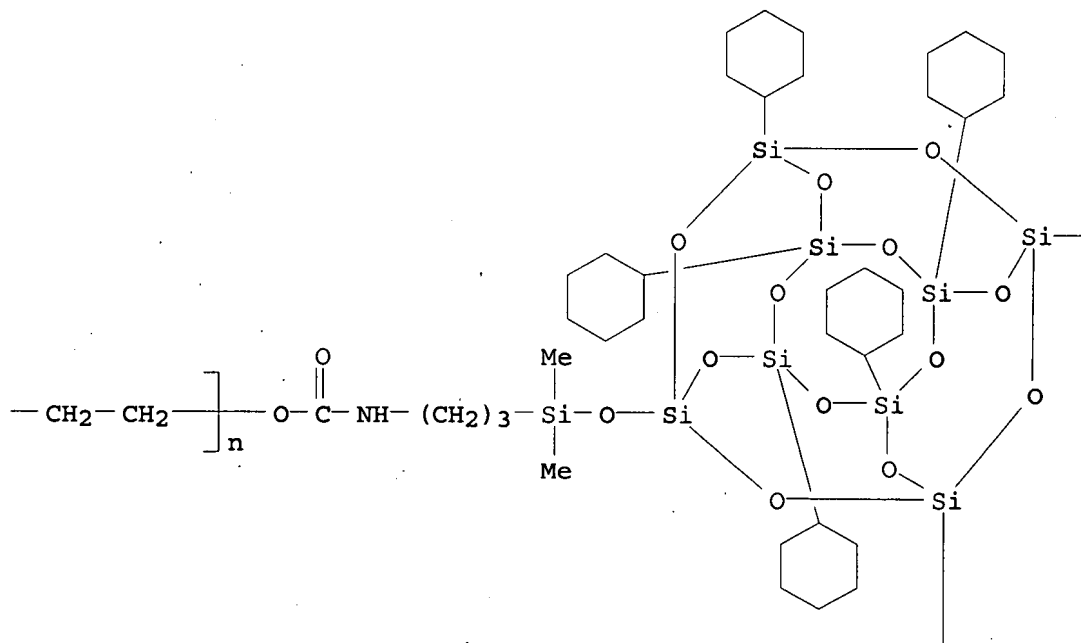
- IT Polyoxyalkylenes, reactions  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(preparation of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT Memory devices  
(shape; uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT Polyethers, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(silsesquioxane-; uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT Polymers, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(telechelic; uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT Adhesives  
Battery electrolytes  
Impact modifiers  
Polymer electrolytes  
Thickening agents  
(uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT Epoxy resins, uses  
Polysulfones, uses  
Polyurethanes, uses  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT 77-58-7, Dibutyl tin dilaurate  
RL: CAT (Catalyst use); USES (Uses)  
(preparation of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT 25322-68-3, Polyethylene glycol 476168-98-6  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(preparation of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT 476168-99-7P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(preparation of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT 652973-99-4  
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
(preparation of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT 9003-20-7, Polyvinylacetate 9003-42-3, Polyethylmethacrylate  
9003-53-6D, Polystyrene, sulfonated 9011-14-7,  
**Polymethylmethacrylate**  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- IT 476168-99-7P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(preparation of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane (POSS))
- RN 476168-99-7 HCAPLUS
- CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -[[[3-[[[(3,5,7,9,11,13,15-heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-

yl)oxy]dimethylsilyl]propyl]amino]carbonyl]- $\omega$ -[[[3-  
 [[(3,5,7,9,11,13,15-heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octas  
 iloxan-1-yl)oxy]dimethylsilyl]propyl]amino]carbonyl]oxy]- (CA INDEX NAME)

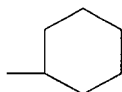
PAGE 1-A



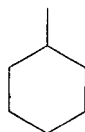
PAGE 1-B



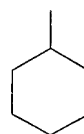
PAGE 1-C



PAGE 2-A



PAGE 2-B



RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

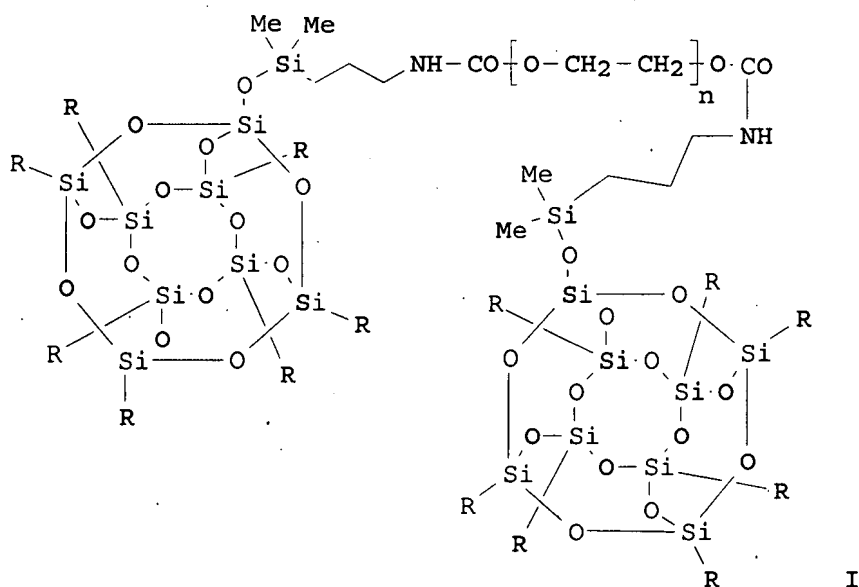
L36 ANSWER 12 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2004:100839 HCAPLUS  
DN 140:146682  
TI Synthesis of nonionic telechelic polymers incorporating polyhedral  
oligosilsesquioxane and uses thereof  
IN Mather, Patrick T.; Kim, Byoung-Suhk; Ge, Qing; Liu, Changdeng  
PA University of Connecticut, USA  
SO U.S. Pat. Appl. Publ., 20 pp.  
CODEN: USXXCO  
DT Patent  
LA English  
FAN.CNT 7

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004024098	A1	20040205	US 2003-620644	20030716
	US 7067606	B2	20060627		
	WO 2004011525	A1	20040205	WO 2003-US22898	20030723
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH,				

PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ,  
 UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,  
 KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,  
 FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,  
 BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

AU 2003254106	A1	20040216	AU 2003-254106	20030723
PRAI US 2002-399599P	P	20020730		
US 2003-620644	A	20030716		
US 2003-488590P	P	20030718		
WO 2003-US22898	W	20030723		

GI



AB Amphiphilic telechelics incorporating polyhedral oligosilsesquioxane (POSS) is synthesized by direct urethane linkage between the diol end groups of polyethylene glycol (PEG) homopolymers and the monoisocyanate group of POSS macromers. An amphiphilic telechelic incorporating POSS has the following structure I, wherein R is a cyclic hydrocarbon selected from the group of cyclohexyl, cyclopentyl, cyclooctyl, Me, Et, Pr, iso-Pr, Bu, iso-Bu, styryl, vinyl, allyl, methylphenyl or an aryl group selected from the group of Ph, biphenyl, naphthyl. The hydrophobicity of the amphiphilic telechelics can be varied by using PEG homopolymers of increasing MW, providing for control over mol. architecture by hydrophilic/hydrophobic balance. This amphiphilic telechelics can be used as surfactants, thickening agents, additives to plastic such as PMMA (Plexiglass) and epoxy adhesives for improved properties.

IC ICM C08J003-00

INCL 524268000

CC 35-8 (Chemistry of Synthetic High Polymers)  
 Section cross-reference(s): 37, 46

ST polyoxyethylene isocyanato oligosilsesquioxane reaction product prepn, property; isocyanatodimethylsilylcyclohexyl polyhedral oligosilsesquioxane prepn property use; amphiphilic surfactant polyether silsesquioxane

telechelic; toughening agent polyether silsesquioxane

IT Surfactants  
(amphiphilic; uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane)

IT Silsesquioxanes  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(polyether-; synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

IT Memory devices  
(shape; uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane)

IT Polyethers, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(silsesquioxane-; synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

IT Polyoxyalkylenes, reactions  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

IT Polymers, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(telechelic; synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

IT Impact modifiers  
Polymer electrolytes  
Thickening agents  
(uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane)

IT Epoxy resins, uses  
Polysulfones, uses  
Polyurethanes, uses  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane)

IT 77-58-7, Dibutyl tin dilaurate  
RL: CAT (Catalyst use); USES (Uses)  
(synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

IT 25322-68-3, Polyethylene glycol 476168-98-6  
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)  
(synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

IT 476168-99-7P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

IT 9003-20-7, Polyvinylacetate 9003-42-3, Polyethylmethacrylate  
9003-53-6D, Polystyrene, sulfonated 9011-14-7,  
Polymethylmethacrylate  
RL: POF (Polymer in formulation); TEM (Technical or engineered material use); USES (Uses)  
(uses of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane)

IT 476168-99-7P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(synthesis of nonionic telechelic polymers incorporating polyhedral oligosilsesquioxane and uses thereof)

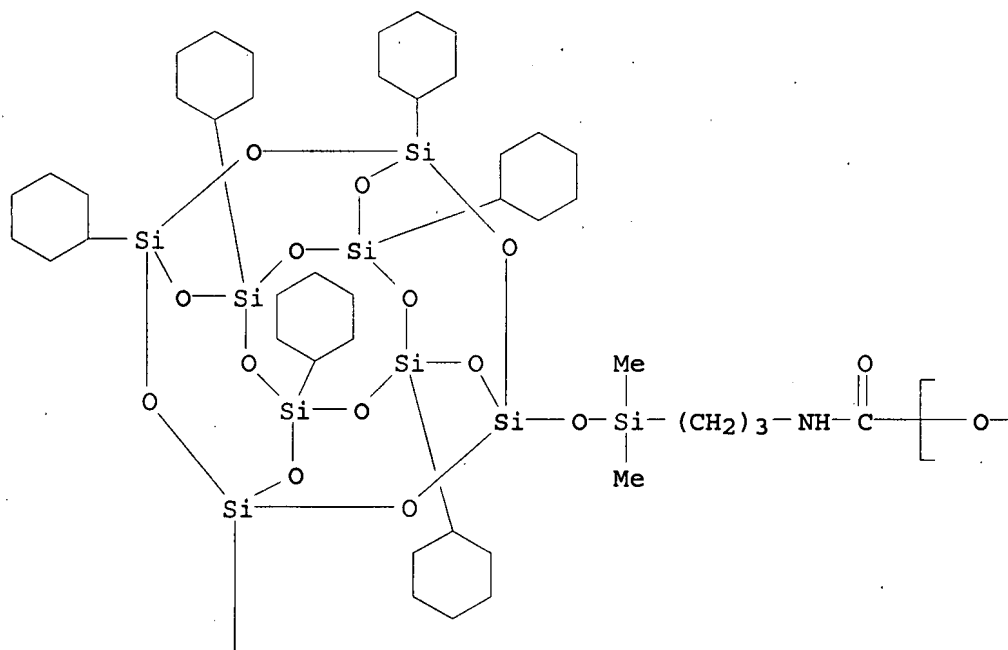
RN 476168-99-7 HCAPLUS

CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -[[[3-[[[3,5,7,9,11,13,15-

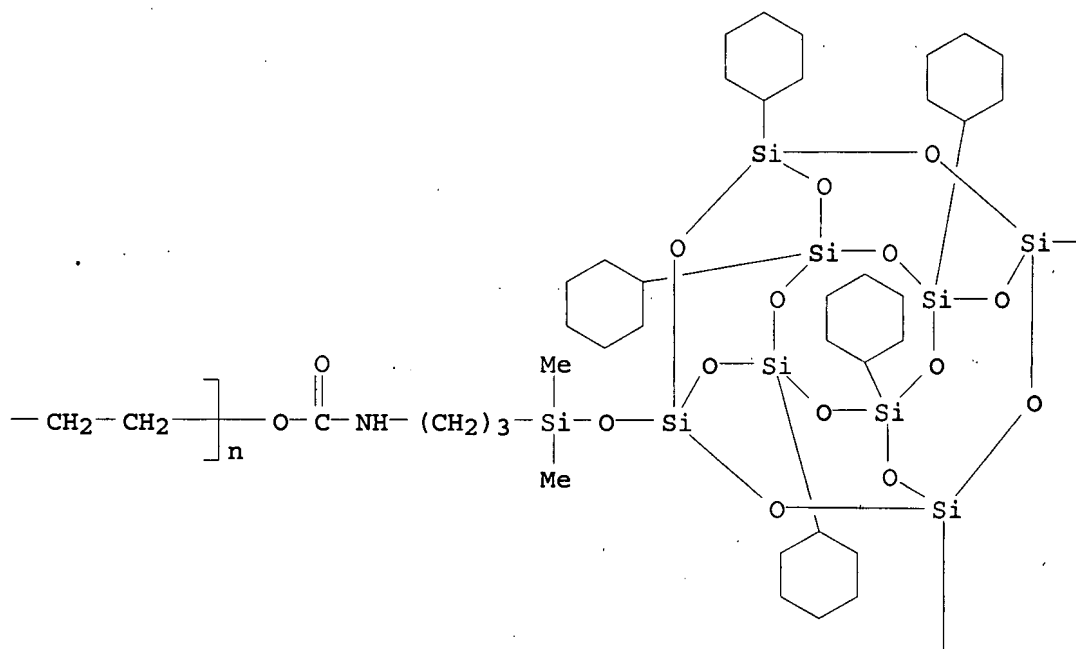


heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl)oxy]dimethylsilyl]propyl]amino]carbonyl]-ω-[[[3-[[[3,5,7,9,11,13,15-heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl)oxy]dimethylsilyl]propyl]amino]carbonyl]oxy]- (CA INDEX NAME)

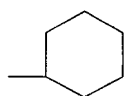
PAGE 1-A



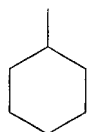
PAGE 1-B

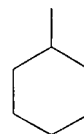


PAGE 1-C



PAGE 2-A





RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 13 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2003:262984 HCAPLUS

DN 139:69571

TI ABA triblock copolymers containing polyhedral oligomeric silsesquioxane pendant groups: synthesis and unique properties

AU Pyun, Jeffrey; Matyjaszewski, Krzysztof; Wu, Jian; Kim, Gyeong-Man; Chun, Seung B.; Mather, Patrick T.

CS Center for Macromolecular Engineering, Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, 15213, USA

SO Polymer (2003), 44(9), 2739-2750

CODEN: POLMAG; ISSN: 0032-3861

PB Elsevier Science Ltd.

DT Journal

LA English

AB The synthesis and characterization of POSS (polyhedral oligomeric silsesquioxane) containing ABA triblock copolymers is reported. The use of atom transfer radical polymerization (ATRP) enabled the preparation of well-defined

model copolymers possessing a rubbery poly(Bu acrylate) (pBA) middle segment and glassy poly(3-(3,5,7,9,11,13,15-hepta-isobutyl-pentacyclo[9.5.1.13,9.15,15.17,13]-octasiloxane-1-yl)propyl methacrylate) (p(MA-POSS)) outer segments. By tuning the relative composition and d.p. (DP) of the two segments, phase separated microstructures were formed in thin films of the copolymer. Specifically, dynamic mech. anal. and transmission electron microscopy (TEM) observations reveal that for a small molar ratio of p(MA-POSS)/pBA (DP = 6/481/6) no evidence of microphase separation is evident while a large ratio (10/201/10) reveals strong microphase separation. Surprisingly, the microphase-separated material

exhibits a

tensile modulus larger than expected (ca.  $2 \times 10^8$  Pa) for a continuous rubber phase for temps. between a pBA-related  $T_g$  and a softening point for the p(MA-POSS)-rich phase. Transmission electron microscopy (TEM) images with selective staining for POSS revealed the formation of a morphol. consisting of pBA cylinders in a continuous p(MA-POSS) phase. Thermal studies have revealed the existence of two clear glass transitions in the microphase-separated system with strong phys. aging evident for annealing temps. near the  $T_g$  of the higher  $T_g$  phase (p(MA-POSS)). The observed aging is reflected in wide-angle X-ray scattering as the strengthening of a low-angle POSS-dominated scattering peak, suggesting some level of ordering during phys. aging. The  $T_g$  of the POSS-rich phase observed in the microphase separated triblock copolymer was nearly  $25^\circ$  higher than that of a POSS-homopolymer of the same mol. weight, suggesting a strong confinement-based enhancement of  $T_g$  in this system.

CC 35-4 (Chemistry of Synthetic High Polymers)

ST polyhedral oligomeric silsesquioxane block copolymer prepn thermal mech property

IT Polymerization

(atom transfer, radical; synthesis and unique properties of ABA triblock copolymers containing polyhedral oligomeric silsesquioxane pendant groups)

IT Glass transition temperature  
Loss modulus  
Polymer morphology  
Softening (mechanical)  
Storage modulus  
Tensile strength

(synthesis and unique properties of ABA triblock copolymers containing polyhedral oligomeric silsesquioxane pendant groups)

IT 868-73-5DP, Dimethyl-2,6-dibromoheptanedioate, reaction products with poly(Bu acrylate) 9003-49-0DP, Poly(butyl acrylate), reaction products with dimethyl-2,6-dibromoheptanedioate  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(macromer; synthesis and unique properties of ABA triblock copolymers containing polyhedral oligomeric silsesquioxane pendant groups)

IT 425409-08-1P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(synthesis and unique properties of ABA triblock copolymers containing polyhedral oligomeric silsesquioxane pendant groups)

IT 255872-36-7P 548798-38-5P 841235-76-5P  
842141-07-5P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(triblock; synthesis and unique properties of ABA triblock copolymers containing polyhedral oligomeric silsesquioxane pendant groups)

IT 425409-08-1P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(synthesis and unique properties of ABA triblock copolymers containing polyhedral oligomeric silsesquioxane pendant groups)

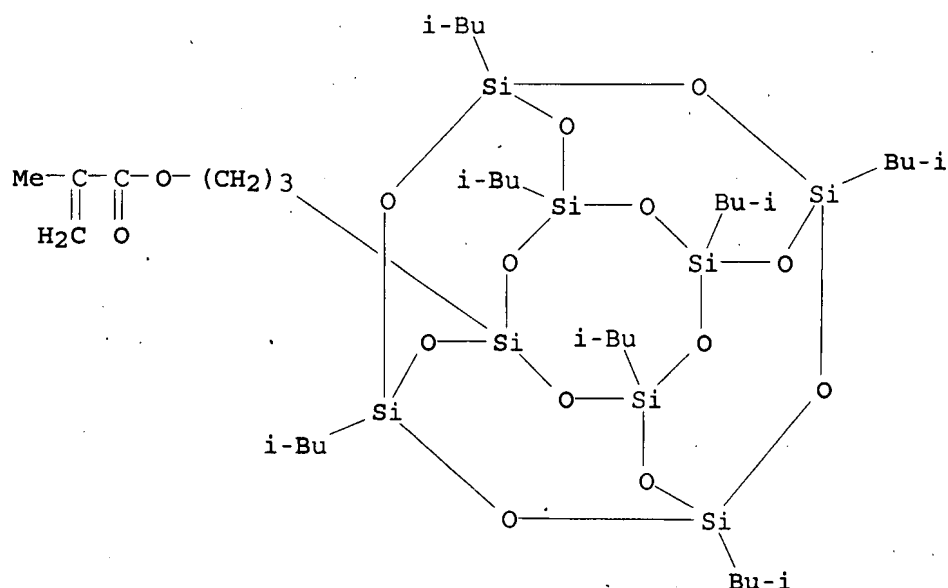
RN 425409-08-1 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.1.3,9.15,15.17,13]octasiloxanyl]propyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 307531-94-8

CMF C35 H74 O14 Si8



IT 255872-36-7P 548798-38-5P 841235-76-5P  
842141-07-5P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(triblock; synthesis and unique properties of ABA triblock copolymers  
containing polyhedral oligomeric silsesquioxane pendant groups)

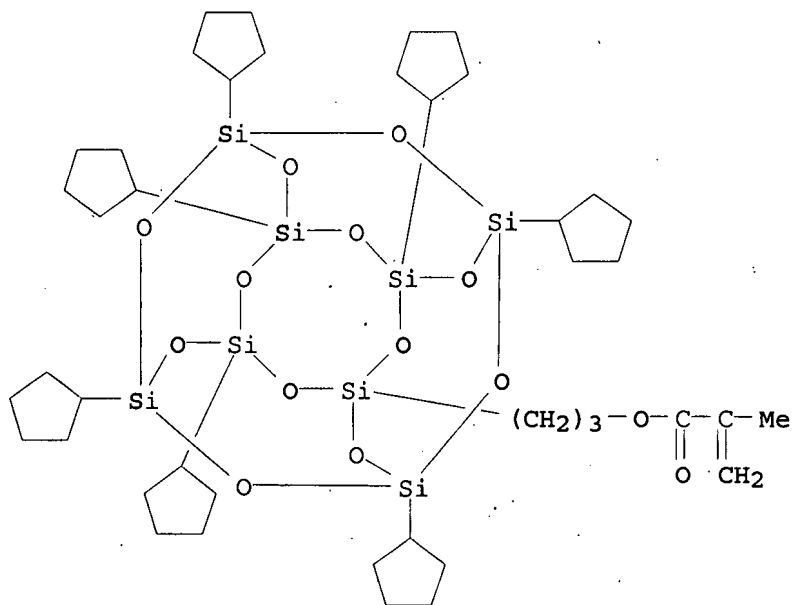
RN 255872-36-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,1  
5.17,13]octasiloxanyl)propyl ester, polymer with butyl 2-propenoate, block  
(9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

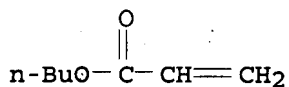
CMF C42 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



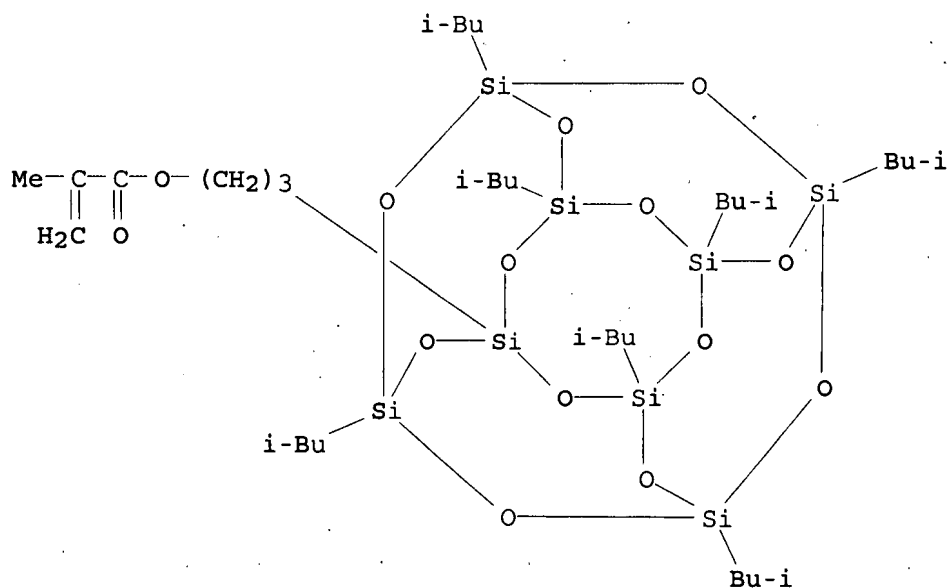
RN 548798-38-5 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.1.1.3,9.15,15.17,13]octasiloxanyl]propyl ester, polymer with butyl 2-propenoate, block (9CI) (CA INDEX NAME)

CM 1

CRN 307531-94-8

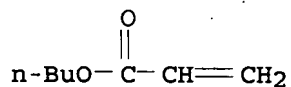
CMF C35 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



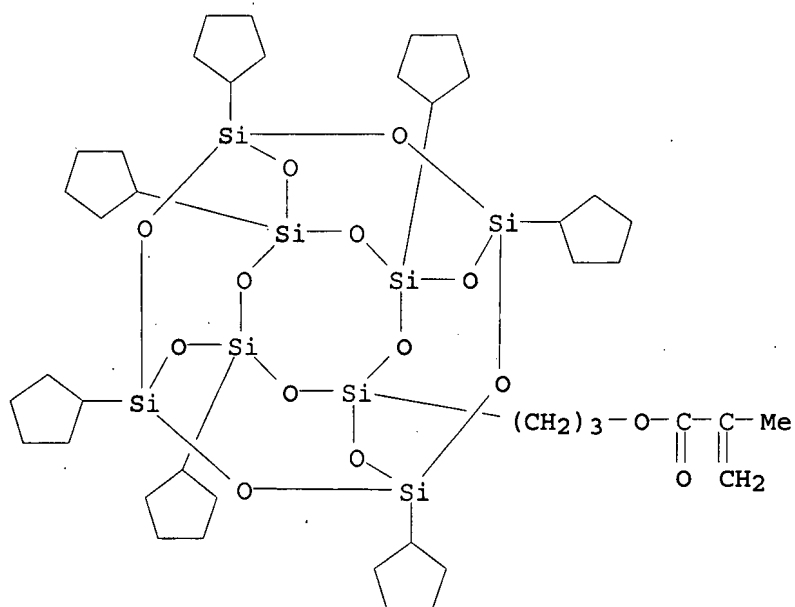
RN 841235-76-5 HCAPLUS

CN 2-Propenoic acid; 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with butyl 2-propenoate, triblock (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

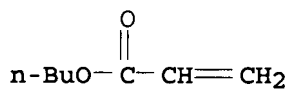
CMF C42 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



RN 842141-07-5 HCAPLUS

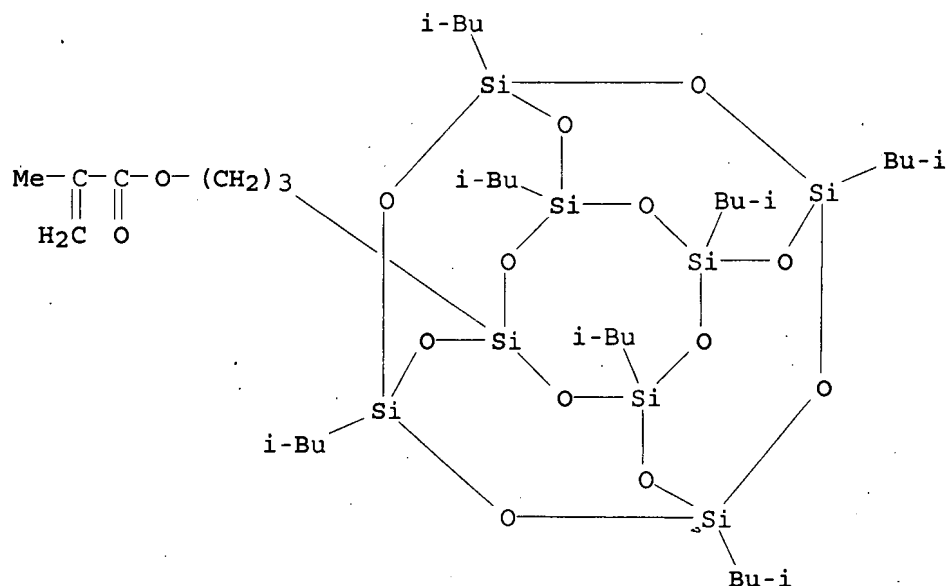
CN 2-Propenoic acid, 2-methyl-, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.1.1.3,9.15,15.17,13]octasiloxanyl]propyl ester, polymer with butyl 2-propenoate, triblock (9CI) (CA INDEX NAME)

CM 1

CRN 307531-94-8

CMF C35 H74 O14 Si8

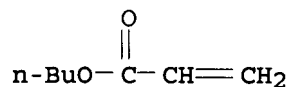




CM 2

CRN 141-32-2

CMF C7 H12 O2



RE.CNT 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 14 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:547502 HCAPLUS

DN 133:135721

TI Functionalizing olefin bearing silsesquioxanes

IN Lichtenhan, Joseph D.; Feher, Frank J.; Soulivong, Daravong

PA United States Dept. of the Air Force, USA

SO U.S., 6 pp.

CODEN: USXXAM

DT Patent

LA English

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 6100417	A	20000808	US 1999-387682	19990831
PRAI US 1999-387682		19990831		

AB Reactive silsesquioxanes or polyhedral oligomeric silsesquioxanes (POSS) having  $\geq 1$  functionalities, useful as building blocks for hybrid inorg./organic materials, are prepared by cleaving  $\geq 1$  olefin bonds in olefin-bearing silsesquioxanes with strong acids or ozone. Thus, Octavinyl octasilsesquioxane ((vinyl)<sub>8</sub>Si<sub>8</sub>O<sub>12</sub>) is reacted with 1 equiv triflic acid in CH<sub>2</sub>Cl<sub>2</sub> to form TfOCH<sub>2</sub>CH<sub>2</sub>(vinyl)<sub>7</sub>Si<sub>8</sub>O<sub>12</sub> at

KATHLEEN FULLER EIC1700 571/272-2505

40-45% yield.

IC ICM C07F002-08

INCL 556460000

CC 35-2 (Chemistry of Synthetic High Polymers)

ST silsesquioxane polyhedral oligomeric olefin bearing functionalization;  
Octavinylloctasilsesquioxane triflate reaction

trifluoromethylsulfonyloxyethylheptavinylloctasilsesquioxane prepn

IT Silsesquioxanes

RL: TEM (Technical or engineered material use); USES (Uses)

(polyhedral oligomeric; functionalizing olefin bearing silsesquioxanes)

IT 286389-21-7P

RL: IMF (Industrial manufacture); PREP (Preparation)

(functionalizing olefin bearing silsesquioxanes)

IT 144139-42-4P 230316-01-5P 230316-14-0P 244096-46-6P 244096-47-7P

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT  
(Reactant or reagent)

(functionalizing olefin bearing silsesquioxanes)

IT 75-75-2, Methanesulfonic acid 1493-13-6, Triflic acid 7664-93-9,  
Sulfuric acid, reactions 7790-94-5, Chlorosulfuric acid 10028-15-6,  
Ozone, reactions 69655-76-1, Octavinylloctasilsesquioxane

RL: RCT (Reactant); RACT (Reactant or reagent)

(functionalizing olefin bearing silsesquioxanes)

IT 286389-21-7P

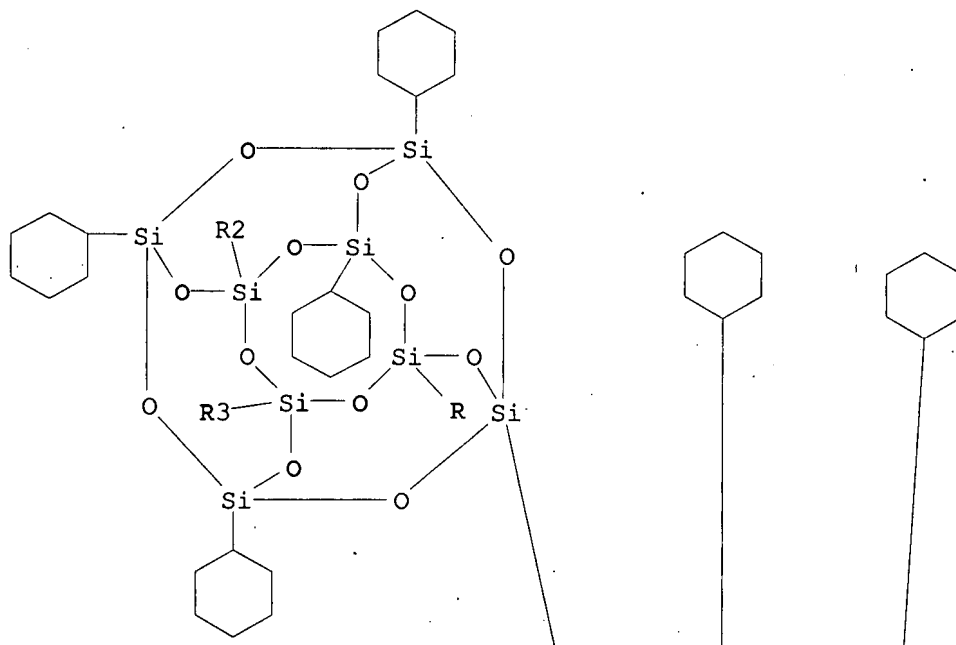
RL: IMF (Industrial manufacture); PREP (Preparation)

(functionalizing olefin bearing silsesquioxanes)

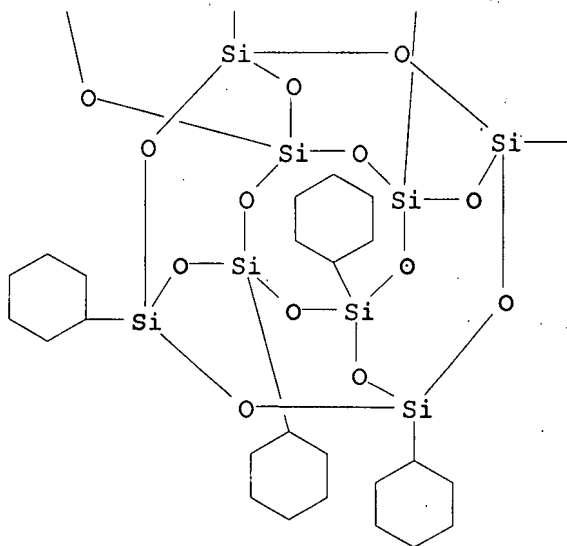
RN 286389-21-7 HCAPLUS

CN Pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane, 1,1'-  
oxybis[3,5,7,9,11,13,15-heptacyclohexyl- (9CI) (CA INDEX NAME)

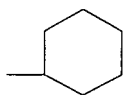
PAGE 1-A



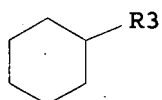
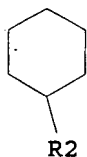
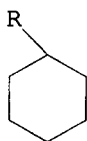
PAGE 2-A



PAGE 2-B



PAGE 3-A



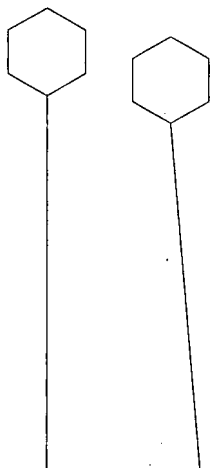
RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

KATHLEEN FULLER EIC1700 571/272-2505

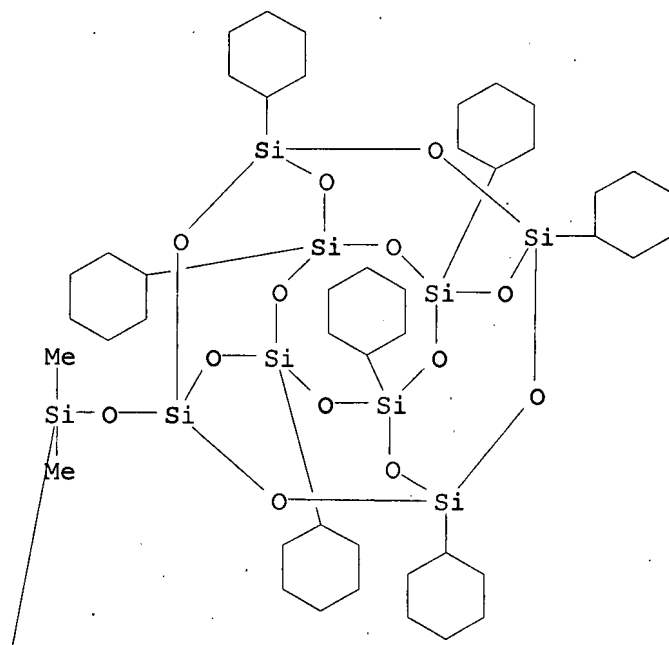
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L36 ANSWER 15 OF 15 HCAPLUS COPYRIGHT 2007 ACS on STN  
 AN 1998:784689 HCAPLUS  
 DN 130:139710  
 TI Polyhedral oligomeric silsesquioxanes (POSS): silicon based monomers and their use in the preparation of **hybrid** polyurethanes  
 AU Schwab, Joseph J.; Lichtenhan, Joseph D.; Chaffee, Kevin P.; Mather, Patrick T.; Romo-Uribe, Angel  
 CS Raytheon STX, Air Force Research Laboratory, Edwards AFB, CA, 93524, USA  
 SO Materials Research Society Symposium Proceedings (1998), 519(Organic/Inorganic Hybrid Materials), 21-27  
 CODEN: MRSPDH; ISSN: 0272-9172  
 PB Materials Research Society  
 DT Journal  
 LA English  
 AB A series of polyhedral oligomeric silsesquioxane (POSS) monomers bearing reactive hydroxyl functionalities, suitable for incorporation into step-growth polymers were prepared. These monomers are difunctional in nature and are particularly well suited for use as chain extenders in the synthesis of polyurethanes. Linear segmented polyurethanes prepared using the monomers demonstrated increased modulus, hardness, glass transition temperature, Tg, temperature of 10% weight loss at a heating rate of 10°/min, Tdec, and increased char yields relative to polyurethanes prepared with conventional diol chain extenders. The POSS monomers provided a nanoscale reinforcement of the hard segment domains.  
 CC 35-5 (Chemistry of Synthetic High Polymers)  
 ST polyhedral oligomeric silsesquioxane chain extender polyurethane  
 IT Polyurethanes, preparation  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (block; synthesis of polyhedral oligomeric silsesquioxanes for use as chain extenders in preparation of **hybrid** block polyurethanes)  
 IT 220001-33-2P 220001-34-3P 220001-35-4P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (monomer; for use as chain extenders in preparation of **hybrid** block polyurethanes)  
 IT 682-11-1 1745-89-7, 2,2'-Diallylbisphenol A 220001-32-1  
 RL: RCT (Reactant); RACT (Reactant or reagent) (reactant; in synthesis of polyhedral oligomeric silsesquioxanes for use as chain extenders in preparation of **hybrid** block polyurethanes)  
 IT 220001-36-5P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (synthesis of polyhedral oligomeric silsesquioxanes for use as chain extenders in preparation of **hybrid** block polyurethanes)  
 IT 220001-34-3P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (monomer; for use as chain extenders in preparation of **hybrid** block polyurethanes)  
 RN 220001-34-3 HCAPLUS  
 CN Phenol, 4,4'-(1-methylethylidene)bis[2-[3-[(heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)oxy]dimethylsilyl]propyl]- (9CI) (CA INDEX NAME)

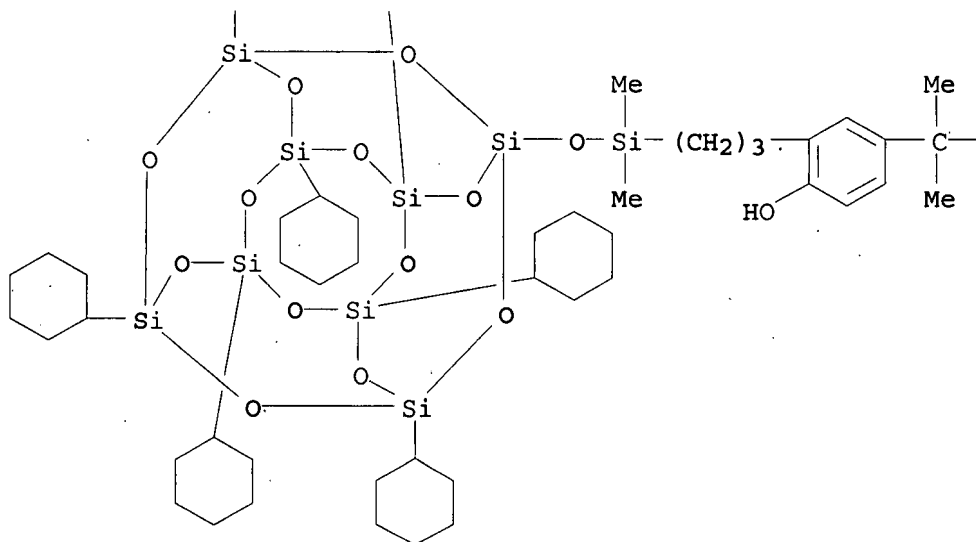
PAGE 1-A



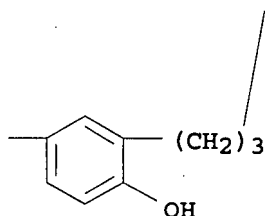
PAGE 1-B



PAGE 2-A



PAGE 2-B



IT 220001-36-5P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(synthesis of polyhedral oligomeric silsesquioxanes for use as chain extenders in preparation of **hybrid** block polyurethanes)

RN 220001-36-5 HCAPLUS

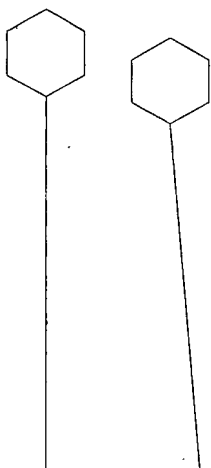
CN Phenol, 4,4'-(1-methylethylidene)bis[3-[3-[[heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl]oxy]dimethylsilyl]propyl]-, polymer with 1,6-diisocyanatohexane and 4,4'-[oxybis(4,1-butanediyl)oxy]bis[1-butanol] (9CI) (CA INDEX NAME)

CM 1

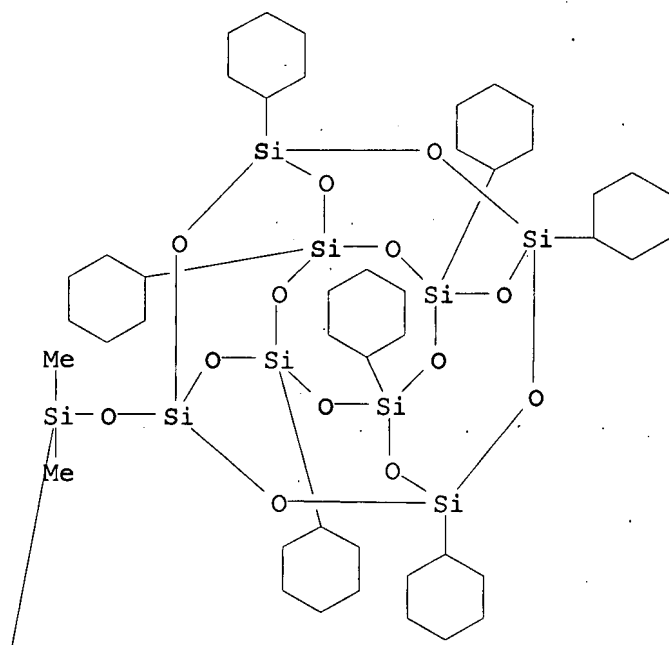
CRN 220001-34-3

CMF C109 H192 028 Si18

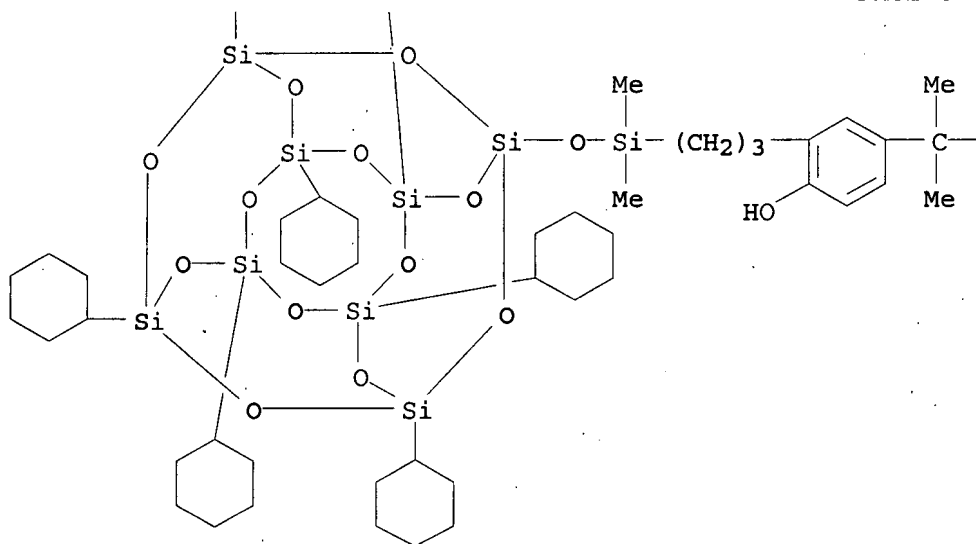
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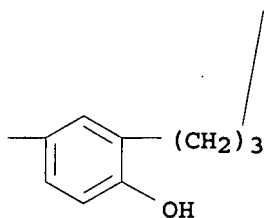
PAGE 1-B



PAGE 2-A

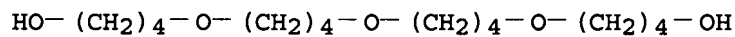


PAGE 2-B



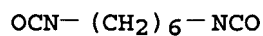
CM 2

CRN 61136-07-0  
CMF C16 H34 O5



CM 3

CRN 822-06-0  
CMF C8 H12 N2 O2



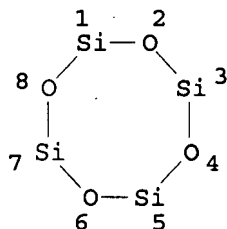
RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

KATHLEEN FULLER EIC1700 571/272-2505



=> d que

L3 STR



NODE ATTRIBUTES:

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DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

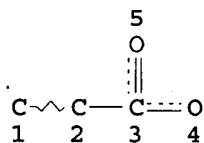
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NUMBER OF NODES IS 8

STEREO ATTRIBUTES: NONE

L5 9434 SEA FILE=REGISTRY SSS FUL L3

L8 STR



NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

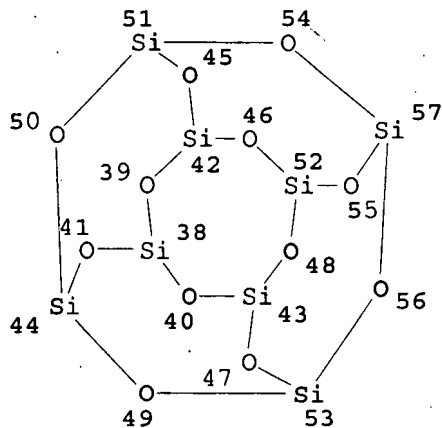
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RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 5

STEREO ATTRIBUTES: NONE

L11 STR



NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 20

STEREO ATTRIBUTES: NONE

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 L20 195 SEA FILE=HCAPLUS ABB=ON L19  
 L21 1 SEA FILE=HCAPLUS ABB=ON L20 AND (MICRO(W)FLUID? OR MICROFLUID?  
 )  
 L22 125 SEA FILE=HCAPLUS ABB=ON L20 (L) PREP/RL  
 L23 1 SEA FILE=HCAPLUS ABB=ON L22 AND TUNING  
 L24 1 SEA FILE=HCAPLUS ABB=ON L19 AND TUNING  
 L25 2 SEA FILE=HCAPLUS ABB=ON L21 OR L23 OR L24  
 L26 49 SEA FILE=REGISTRY ABB=ON 2 7080.1.1/RID  
 L28 41 SEA FILE=HCAPLUS ABB=ON L26  
 L29 2 SEA FILE=HCAPLUS ABB=ON L28 AND ?ACRYL?  
 L30 32 SEA FILE=HCAPLUS ABB=ON L28 (L) PREP/RL  
 L31 4 SEA FILE=HCAPLUS ABB=ON L25 OR L29  
 L32 28 SEA FILE=HCAPLUS ABB=ON L22 AND HYBRID?  
 L33 4 SEA FILE=HCAPLUS ABB=ON L30 AND HYBRID?  
 L34 1 SEA FILE=HCAPLUS ABB=ON L30 AND TUN?  
 L35 7 SEA FILE=HCAPLUS ABB=ON L20 AND TUN?  
 L36 15 SEA FILE=HCAPLUS ABB=ON L31 OR L33 OR L34 OR L35  
 L37 27 SEA FILE=HCAPLUS ABB=ON L32 NOT L36

=> d l37 bib abs ind hitstr 1-27

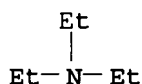
L37 ANSWER 1 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2006:887205 HCAPLUS  
 DN 146:501626  
 TI Nanostructured polyurethane-POSS **hybrid** dispersions by the  
 prepolymer mixing process  
 AU Nanda, Ajaya K.; Wicks, Douglas A.  
 CS School of Polymers and High Performance Materials, The University of  
 Southern Mississippi, Hattiesburg, MS, USA  
 SO PMSE Preprints (2006), 95, 67-69  
 CODEN: PPMRA9; ISSN: 1550-6703  
 PB American Chemical Society  
 DT Journal; (computer optical disk)  
 LA English  
 AB Waterborne nanostructured polyurethane-POSS (polyhedral oligomeric  
 silsesquioxane) **hybrid** dispersions were synthesized through the  
 prepolymer mixing process. To improve the distribution of the POSS  
 monomer in the polyurethane aminoethylaminopropylisobutyl polyhedral  
 oligomeric silsesquioxane was first pre-reacted with excess isophorone  
 diisocyanate in N-methylpyrrolidone. After this reaction the process was  
 continued by reaction with poly(hexylene adipate-isophthalate) diol,  
 dimethylolpropionic acid, and hexamethylenediamine. Dispersion of the  
 polymer was accomplished with tri-Et amine as the neutralizing base. The  
 particle size and viscosity of the dispersions were not affected by POSS  
 loading. The resulting polyurethane dispersions did show evidence of some  
 phase inhomogeneity as evidenced by wide angle X-ray diffraction patterns  
 of cast films. Dynamic mech. anal. showed reinforcement effect reflected  
 by the increase in the storage moduli and Tg of the hard segment.  
 CC 37-3 (Plastics Manufacture and Processing)  
 Section cross-reference(s): 35  
 ST polyurethane polyhedral oligomeric silsesquioxane **hybrid**  
 dispersion mech property

- IT Polyurethanes, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(polyester-polyurea-, block; preparation of nanostructured  
polyurethane-polyhedral oligomeric silsesquioxane **hybrid**  
dispersions by prepolymer mixing process)
- IT Polyureas  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(polyester-polyurethane-, block; preparation of nanostructured  
polyurethane-polyhedral oligomeric silsesquioxane **hybrid**  
dispersions by prepolymer mixing process)
- IT Polyesters, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(polyurea-polyurethane-, block; preparation of nanostructured  
polyurethane-polyhedral oligomeric silsesquioxane **hybrid**  
dispersions by prepolymer mixing process)
- IT Contact angle  
Disperse systems  
Glass transition temperature  
Loss modulus  
Storage modulus  
(properties of nanostructured polyurethane-polyhedral oligomeric  
silsesquioxane **hybrid** dispersions prepared by prepolymer mixing  
process)
- IT Complex modulus  
(tan  $\delta$ ; properties of nanostructured polyurethane-polyhedral  
oligomeric silsesquioxane **hybrid** dispersions prepared by  
prepolymer mixing process)
- IT 936448-11-2P 936448-13-4P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)  
(composed of actual and assumed monomers; preparation of nanostructured  
polyurethane-polyhedral oligomeric silsesquioxane **hybrid**  
dispersions by prepolymer mixing process)
- IT 936448-11-2P 936448-13-4P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)  
(composed of actual and assumed monomers; preparation of nanostructured  
polyurethane-polyhedral oligomeric silsesquioxane **hybrid**  
dispersions by prepolymer mixing process)
- RN 936448-11-2 HCAPLUS
- CN 1,3-Benzenedicarboxylic acid, polymer with Desmodur I,  
N1- [3- [3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,1  
5.17,13]octasiloxan-1-yl]propyl]-1,2-ethanediamine, hexanedioic acid,  
1,6-hexanediol and 3-hydroxy-2-(hydroxymethyl)-2-methylpropanoic acid,  
block, compd. with N,N-diethylethanamine (CA INDEX NAME)

CM 1

CRN 121-44-8

CMF C6 H15 N



CM 2

CRN 936448-10-1

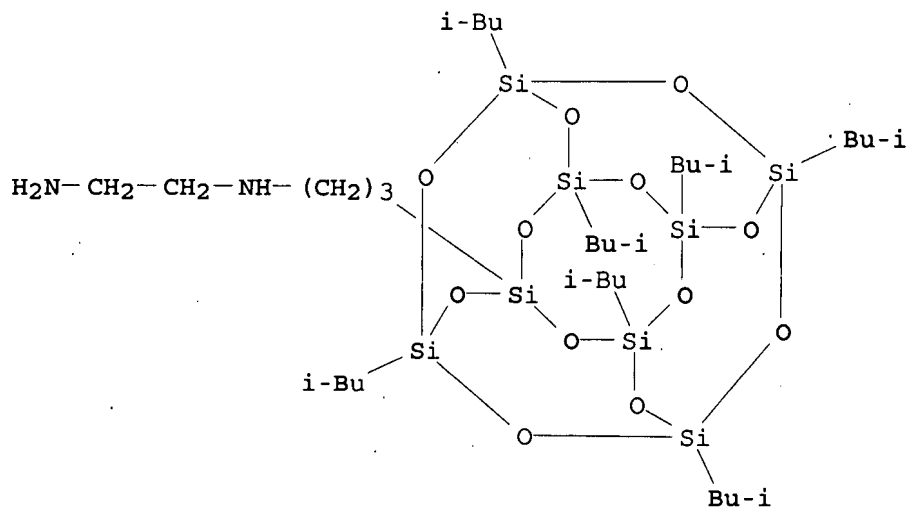
CMF (C33 H76 N2 O12 Si8 . C8 H6 O4 . C6 H14 O2 . C6 H10 O4 . C5 H10 O4 .  
Unspecified)x

CCI PMS

CM 3

CRN 444315-16-6

CMF C33 H76 N2 O12 Si8



CM 4

CRN 202149-37-9

CMF Unspecified

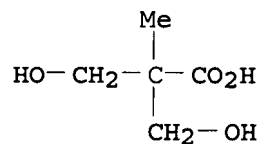
CCI PMS, MAN

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CM 5

CRN 4767-03-7

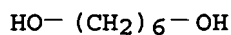
CMF C5 H10 O4



CM 6

CRN 629-11-8

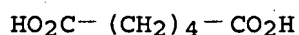
CMF C6 H14 O2



CM 7

CRN 124-04-9

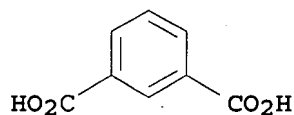
CMF C6 H10 O4



CM 8

CRN 121-91-5

CMF C8 H6 O4



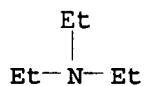
RN 936448-13-4 HCAPLUS

CN 1,3-Benzenedicarboxylic acid, polymer with N1-[3-[3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl]propyl]-1,2-ethanediamine, hexanedioic acid, 1,6-hexanediol, 3-hydroxy-2-(hydroxymethyl)-2-methylpropanoic acid and 5-isocyanato-1-(isocyanatomethyl)-1,3,3-trimethylcyclohexane, block, compd. with N,N-diethylethanamine (CA INDEX NAME)

CM 1

CRN 121-44-8

CMF C6 H15 N



CM 2

CRN 936448-12-3

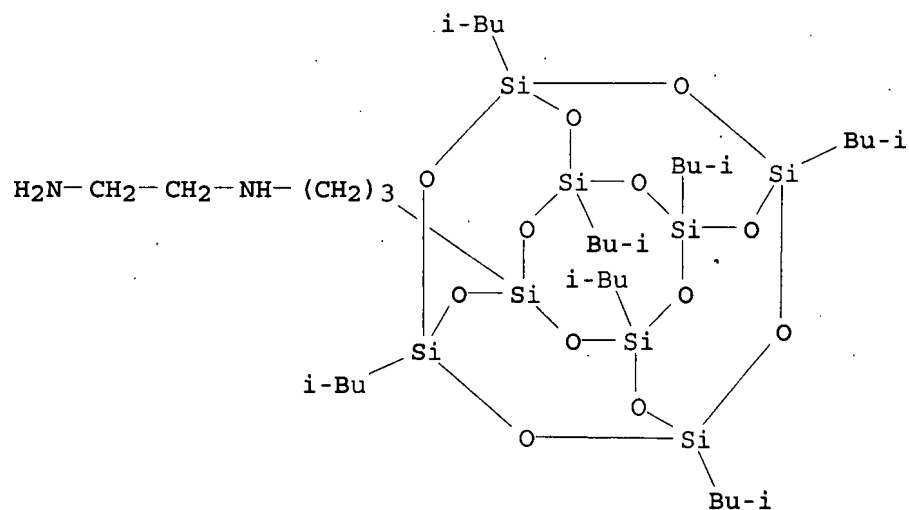
CMF (C33 H76 N2 O12 Si8 . C12 H18 N2 O2 . C8 H6 O4 . C6 H14 O2 . C6 H10 O4 . C5 H10 O4)x

CCI PMS

CM 3

CRN 444315-16-6

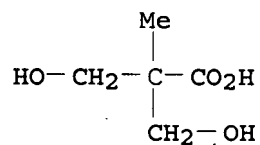
CMF C33 H76 N2 O12 Si8



CM 4

CRN 4767-03-7

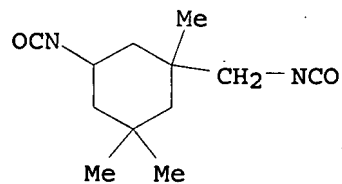
CMF C5 H10 O4



CM 5

CRN 4098-71-9

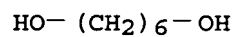
CMF C12 H18 N2 O2



CM 6

CRN 629-11-8

CMF C6 H14 O2



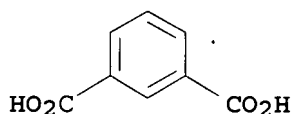
CM 7

CRN 124-04-9  
CMF C6 H10 O4



CM 8

CRN 121-91-5  
CMF C8 H6 O4



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 2 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:882317 HCAPLUS

DN 145:455345

TI Nanostructured Polyurethane/POSS Hybrid Aqueous Dispersions  
Prepared by Homogeneous Solution Polymerization

AU Nanda, Ajaya K.; Wicks, Douglas A.; Madbouly, Samy A.; Otaigbe, Joshua U.

CS School of Polymers and High Performance Materials, University of Southern  
Mississippi, Hattiesburg, MS, 9406, USA

SO Macromolecules (2006), 39(20), 7037-7043

CODEN: MAMOBX; ISSN: 0024-9297

PB American Chemical Society

DT Journal

LA English

AB Aqueous polyurethane dispersions were prepared with 4-10 wt % of functionalized  
polyhedral oligomeric silsesquioxanes (POSS) via homogeneous solution  
polymerization

in acetone followed by solvent exchange with water. The use of acetone as  
the initial polymerization solvent allowed for the facile incorporation of both  
diamino and dihydroxy functional POSS monomers in a homogeneous reaction  
environment. After addition of water and removal of the acetone, stable  
dispersions with unimodal particle sizes were obtained. The incorporation  
of the POSS monomers did not have a significant effect on the dispersion's  
properties; however, the phys. properties of the isolated polymers did  
display significant changes, with notable increases in storage modulus,  
Tg, complex viscosity, and surface hydrophobicity. These changes were  
attributed to the incorporation of the POSS residues into the polyurethane  
hard segment domains found. Though no sign of any gross phase  
heterogeneity due to the inclusion of POSS moieties was detected by either  
thermal characterization or wide-angle X-ray diffraction (WAXD), a  
significant change was observed by atomic force microscopy (AFM) when the  
samples were recast from organic solvent.

CC 35-5 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 36

- ST silsesquioxane contg polyurethane dispersion morphol thermal mech surface property
- IT Polymer morphology
  - (domain; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Contact angle
  - Dispersion (of materials)
  - Elongation at break
  - Glass transition temperature
  - Hybrid** organic-inorganic materials
  - Particle size
  - Particle size distribution
  - Storage modulus
  - Tensile strength
  - Viscosity
  - X-ray diffraction
  - Young's modulus
    - (nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Polyurethanes, preparation
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
  - (polyester-, block, silsesquioxane-substituted; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Polyurethanes, preparation
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
  - (polyester-, block; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Polyurethanes, preparation
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
  - (polyester-polyurea-, block, silsesquioxane-substituted; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Polyureas
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
  - (polyester-polyurethane-, block, silsesquioxane-substituted; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Polyesters, preparation
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
  - (polyurea-polyurethane-, block, silsesquioxane-substituted; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Softening (mechanical)
  - (softening point; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Storage
  - (stability; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Polymer morphology
  - (surface; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT Complex modulus
  - (tan  $\delta$ ; nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)
- IT 913341-91-0P 913341-93-2P 913341-97-6P
  - RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
  - (nanostructured polyurethane/POSS **hybrid** aqueous dispersions prepared by homogeneous solution polymerization)



IT 913341-93-2P 913341-97-6P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(nanostructured polyurethane/POSS hybrid aqueous dispersions  
prepared by homogeneous solution polymerization)

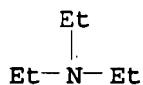
RN 913341-93-2 HCAPLUS

CN 1,3-Benzenedicarboxylic acid, polymer with 1,4-butanediol, Desmodur I,  
N1-[3-[3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,1  
5.17,13]octasiloxan-1-yl]propyl]-1,2-ethanediamine, hexanedioic acid,  
1,6-hexanediol and 3-hydroxy-2-(hydroxymethyl)-2-methylpropanoic acid,  
block, compd. with N,N-diethylethanamine (CA INDEX NAME)

CM 1

CRN 121-44-8

CMF C6 H15 N



CM 2

CRN 913341-92-1

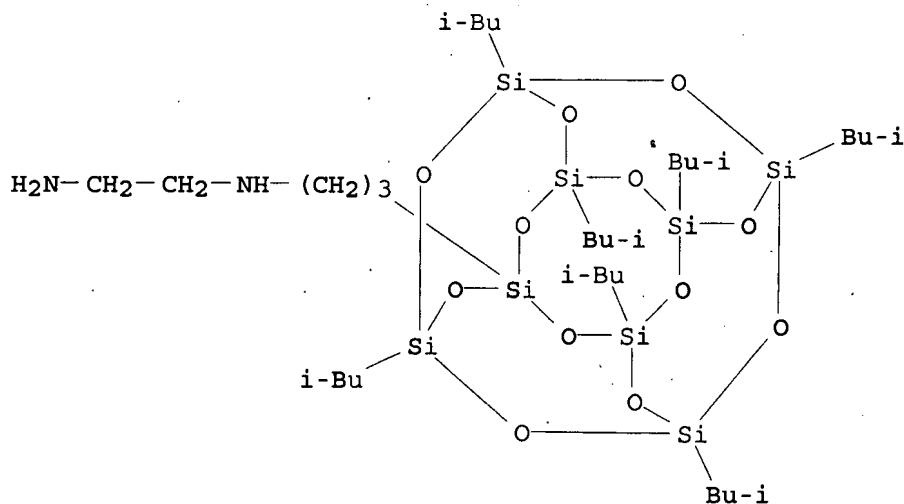
CMF (C33 H76 N2 O12 Si8 . C8 H6 O4 . C6 H14 O2 . C6 H10 O4 . C5 H10 O4 .  
C4 H10 O2 . Unspecified)x

CCI PMS

CM 3

CRN 444315-16-6

CMF C33 H76 N2 O12 Si8



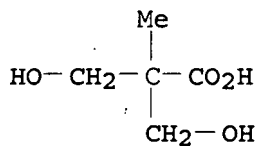
CM 4

CRN 202149-37-9  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

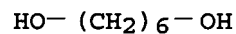
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CRN 4767-03-7  
CMF C5 H10 O4



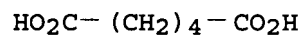
CM 6

CRN 629-11-8  
CMF C6 H14 O2



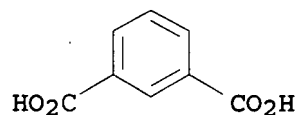
CM 7

CRN 124-04-9  
CMF C6 H10 O4



CM 8

CRN 121-91-5  
CMF C8 H6 O4



CM 9

CRN 110-63-4  
CMF C4 H10 O2

HO-(CH<sub>2</sub>)<sub>4</sub>-OH

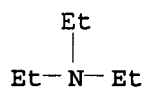
RN 913341-97-6 HCAPLUS

CN 1,3-Benzenedicarboxylic acid, polymer with 1,4-butanediol, Desmodur I, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxany 1]oxy]-1,2-propanediol, hexanedioic acid, 1,6-hexanediol and 3-hydroxy-2-(hydroxymethyl)-2-methylpropanoic acid, block, compd. with N,N-diethylethanamine (9CI) (CA INDEX NAME)

CM 1

CRN 121-44-8

CMF C6 H15 N



CM 2

CRN 913341-96-5

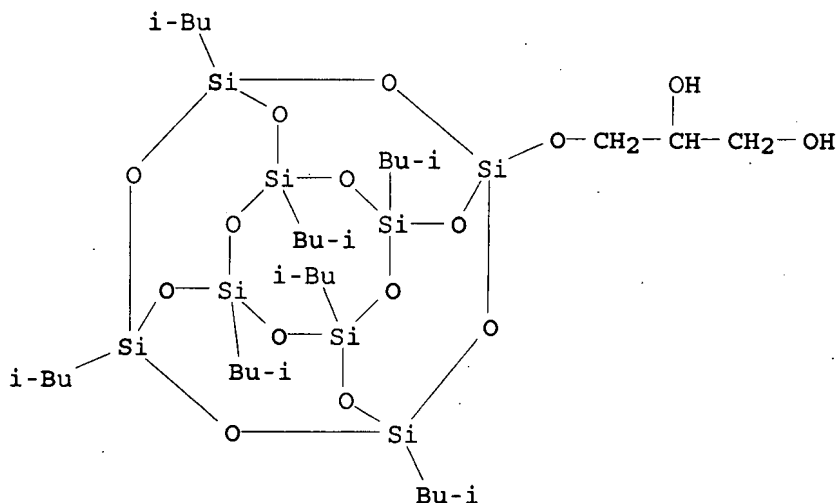
CMF (C31 H70 O15 Si8 . C8 H6 O4 . C6 H14 O2 . C6 H10 O4 . C5 H10 O4 . C4 H10 O2 . Unspecified)x

CCI PMS

CM 3

CRN 913341-95-4

CMF C31 H70 O15 Si8



CM 4

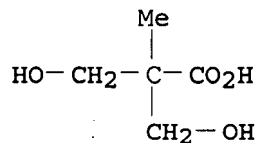
CRN 202149-37-9

CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

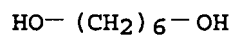
CM 5

CRN 4767-03-7  
CMF C5 H10 O4



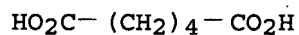
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CRN 629-11-8  
CMF C6 H14 O2



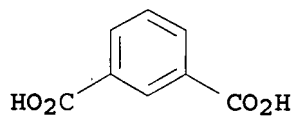
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CRN 124-04-9  
CMF C6 H10 O4



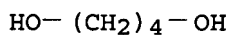
CM 8

CRN 121-91-5  
CMF C8 H6 O4



CM 9

CRN 110-63-4  
CMF C4 H10 O2



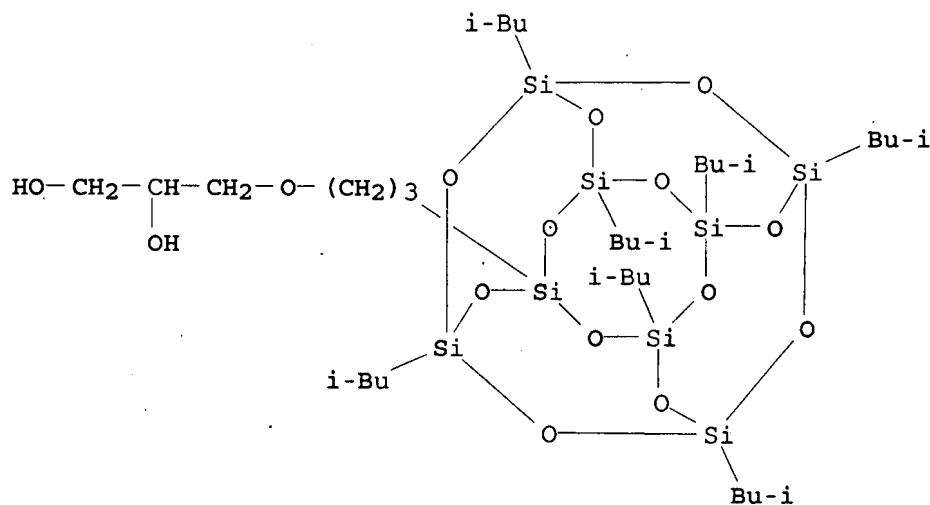
RE.CNT 45 THERE ARE 45 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 3 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2006:827190 HCAPLUS  
DN 145:377630  
TI Preparation and characterization of polyurethane **hybrids** from reactive polyhedral oligomeric silsesquioxanes  
AU Zhang, Shiling; Zou, Qichao; Wu, Limin  
CS Faculty of Chemistry and Material Science, Hubei University, Wuhan, 430062, Peop. Rep. China  
SO Macromolecular Materials and Engineering (2006), 291(7), 895-901  
CODEN: MMENFA; ISSN: 1438-7492  
PB Wiley-VCH Verlag GmbH & Co. KGaA  
DT Journal  
LA English  
AB **Hybrid** polyester resins containing a polyhedral oligomeric silsesquioxane (POSS), and their polyurethanes were prepared using a reactive POSS (3-[3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.13.9.15.15.17,13]octasil oxanyl]propoxy]-1,2-propanediol) as a substitution for part of the diol monomers. They were investigated by FTIR, rheometry, dynamic mech. anal., wide-angle x-ray diffraction, contact-angle measurement, atomic force microscopy, and thermogravimetric anal., resp. The **hybrid** polyester-POSS resins had a shear thinning behavior, and the more the POSS was embedded, the stronger the shear thinning behavior, and the higher the viscosity. Incorporation of POSS could increase the glass transition temperature and thermal stability and decrease the surface free energy of the polyurethanes. When the POSS content was relatively high, the POSS mols. in **hybrid** polyurethane-POSS had a strong self-assembling ability to form nanocryst. domains.  
CC 35-5 (Chemistry of Synthetic High Polymers)  
ST polyhedral oligomeric silsesquioxane polyester polyurethane prepn property  
IT Polyurethanes, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polyester-; preparation and characterization of polyester-polyurethane **hybrids** from reactive polyhedral oligomeric silsesquioxane)  
IT Contact angle  
Glass transition temperature  
Surface free energy  
Thermal stability  
Viscosity  
(preparation and characterization of polyester-polyurethane **hybrids** from reactive polyhedral oligomeric silsesquioxane)  
IT Polyesters, preparation  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
(preparation and characterization of polyester-polyurethane **hybrids** from reactive polyhedral oligomeric silsesquioxane)  
IT 911000-98-1P  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
(preparation and characterization of polyester-polyurethane **hybrids** from reactive polyhedral oligomeric silsesquioxane)  
IT 911000-99-2P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(preparation and characterization of polyester-polyurethane **hybrids**

from reactive polyhedral oligomeric silsesquioxane)  
 IT 911000-98-1P  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
 (preparation and characterization of polyester-polyurethane hybrids from reactive polyhedral oligomeric silsesquioxane)  
 RN 911000-98-1 HCAPLUS  
 CN Hexanedioic acid, polymer with 1,4-butanediol, 2,2-dimethyl-1,3-propanediol, 3-[3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl]propoxy]-1,2-propanediol and 1,3-isobenzofurandione (9CI)  
 (CA INDEX NAME)

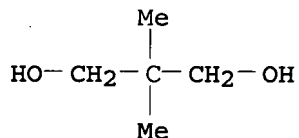
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CRN 480439-49-4  
 CMF C34 H76 O15 Si8



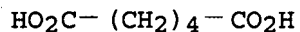
CM 2

CRN 126-30-7  
 CMF C5 H12 O2



CM 3

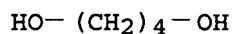
CRN 124-04-9  
 CMF C6 H10 O4



CM 4

CRN 110-63-4

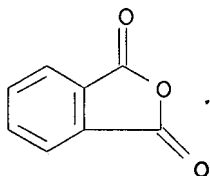
CMF C4 H10 O2



CM 5

CRN 85-44-9

CMF C8 H4 O3



IT 911000-99-2P

RL: PRP (Properties); SPN (Synthetic preparation); PREP  
(Preparation)

(preparation and characterization of polyester-polyurethane hybrids  
from reactive polyhedral oligomeric silsesquioxane)

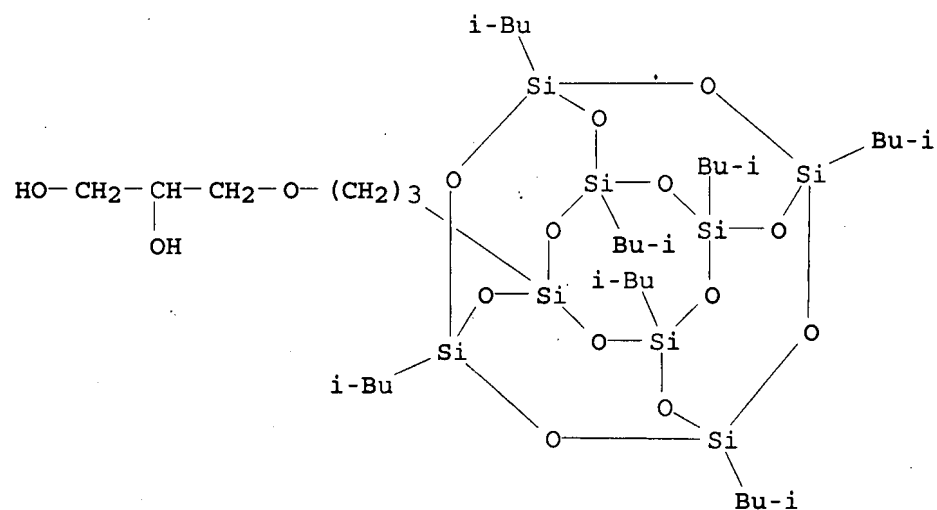
RN 911000-99-2 HCAPLUS

CN Hexanedioic acid, polymer with 1,4-butanediol, 2,2-dimethyl-1,3-  
propanediol, 3-[3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,  
13]octasiloxanyl]propoxy]-1,2-propanediol, 1,3-isobenzofurandione and  
5-isocyanato-1-(isocyanatomethyl)-1,3,3-trimethylcyclohexane (9CI) (CA  
INDEX NAME)

CM 1

CRN 480439-49-4

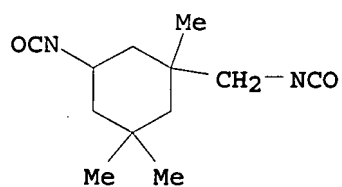
CMF C34 H76 O15 Si8



CM 2

CRN 4098-71-9

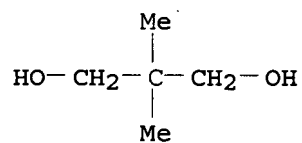
CMF C12 H18 N2 O2



CM 3

CRN 126-30-7

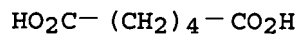
CMF C5 H12 O2



CM 4

CRN 124-04-9

CMF C6 H10 O4





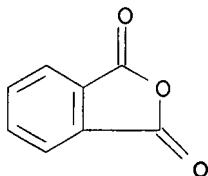
CM 5

CRN 110-63-4  
CMF C4 H10 O2

HO-(CH<sub>2</sub>)<sub>4</sub>-OH

CM 6

CRN 85-44-9  
CMF C8 H4 O3



RE.CNT 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 4 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2006:550234 HCAPLUS  
DN 145:204866  
TI Lamellar to Inverted Hexagonal Mesophase Transition in DNA Complexes with  
Calamitic, Discotic, and Cubic Shaped Cationic Lipids  
AU Cui, Li; Zhu, Lei  
CS Polymer Program Institute of Materials Science and Department of Chemical  
Materials and Biomolecular Engineering, University of Connecticut, Storrs,  
CT, 06269-3136, USA  
SO Langmuir (2006), 22(14), 5982-5985  
CODEN: LANGD5; ISSN: 0743-7463  
PB American Chemical Society  
DT Journal  
LA English  
AB In this study, we report on the lipid tail mol. shape/size effect on the  
mesophase self-assembly behaviors of various cationic lipids complexed  
with double-stranded DNA. The mol. shape of the cationic lipids was  
tailored from rodlike (a cyanobiphenyl imidazolium salt) to discotic (a  
triphenylene imidazolium salt), and finally to cubic [a polyhedral  
oligomeric silsesquioxane (POSS) imidazolium salt]. An increase in the  
cross-sectional area of the hydrophobic tails with respect to the  
hydrophilic imidazolium head induced a neg. spontaneous curvature of the  
cationic lipids. As a result, a morphol. change from lamello-columnar  
(L<sub>α</sub>C) phase for the DNA-cyanobiphenyl imidazolium salt (DNA-rod) and  
DNA-triphenylene imidazolium salt (DNA-disk) complexes to an inverted  
hexagonal columnar (HIIC) phase for the DNA-POSS imidazolium salt  
(DNA-cube) complex was observed. The DNA-rod complex had a typical smectic A  
(S<sub>mA</sub>) L<sub>α</sub>C morphol., whereas the DNA-disk complex had a double  
lamello-columnar liquid crystalline phase. However, when the lipid tail  
changed  
to POSS, an HIIC morphol. was achieved. These morphol. changes were

successfully characterized by x-ray diffraction and TEM. We expect that these liquid crystalline and crystalline DNA hybrid materials may become potential functional materials for various applications such as organic microelectronics and gene transfection.

CC 6-7 (General Biochemistry)

Section cross-reference(s): 25, 29, 63, 68, 76

ST lamellar inverted hexagonal mesophase transition DNA complex cationic lipid; DNA cyanobiphenyl triphenylene silsesquioxane imidazolium salt complex mesophase transition; mesophase transition DNA calamitic discotic cubic lipid cation complex; cyanobiphenyl imidazolium salt prepn DNA complex mesophase transition; triphenylene imidazolium salt prepn DNA complex mesophase transition; silsesquioxane imidazolium salt prepn DNA complex mesophase transition

IT Lipids, biological studies

RL: BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation)  
(conjugates, with dsDNA; cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT Mesophase

Phase transition

Self-assembly

(cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT DNA

RL: BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation)  
(double-stranded, conjugates with cationic lipids; cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT Drug delivery systems

(liposomes, monolayer (membrane), complexes with DNA; cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT 905304-55-4DP, complexes with dsDNA

RL: BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation)  
(calamitic; cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT 905304-57-6DP, complexes with dsDNA

RL: BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation)  
(cubic; cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT 616-47-7, 1-Methylimidazole 15949-84-5, 11-Bromoundecanoyl chloride 19812-93-2 681235-70-1

RL: RCT (Reactant); RACT (Reactant or reagent)

(cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT 83577-85-9P 905304-56-5P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt

cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

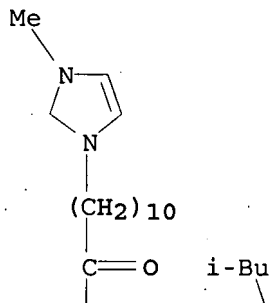
IT 885669-66-9DP, complexes with dsDNA  
 RL: BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation)  
 (discotic; cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

IT 905304-57-6DP, complexes with dsDNA  
 RL: BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); **PREP (Preparation)**  
 (cubic; cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

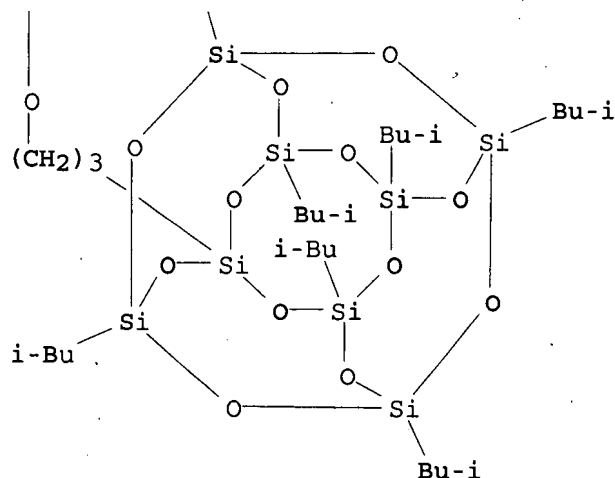
RN 905304-57-6 HCAPLUS

CN 1H-Imidazolium, 1-[11-[3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl]propoxy]-11-oxoundecyl]-3-methyl-, bromide (9CI)  
 (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



ONE OR MORE TAUTOMERIC DOUBLE BONDS NOT DISPLAYED IN THE STRUCTURE

IT 905304-56-5P

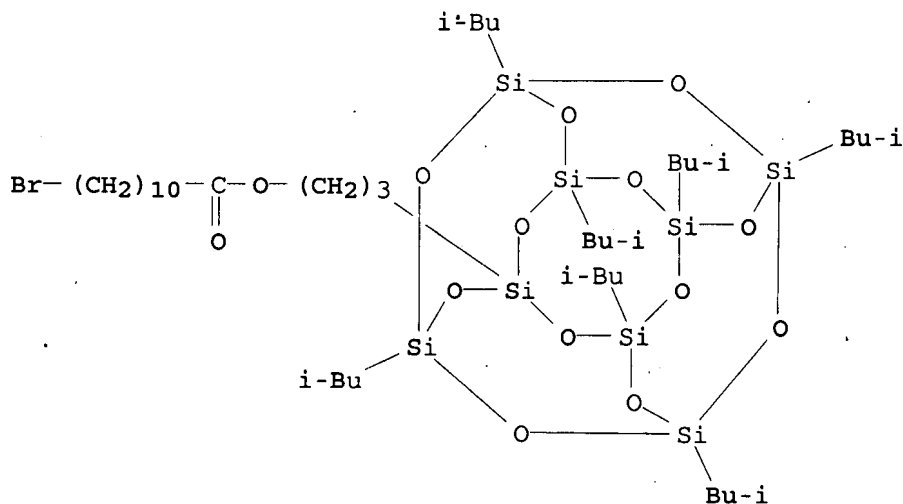
RL: RCT (Reactant); SPN (Synthetic preparation); PREP

(Preparation); RACT (Reactant or reagent)

(cyanobiphenyl-, silsesquioxane-, and triphenylene imidazolium salt cationic lipids preparation and lamellar-to-inverted hexagonal mesophase transition self-assembly in complexes with dsDNA)

RN 905304-56-5 HCAPLUS

CN Undecanoic acid, 11-bromo-, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl]propyl ester (9CI) (CA INDEX NAME)



RE.CNT 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

KATHLEEN FULLER EIC1700 571/272-2505

L37 ANSWER 5 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2006:206761 HCAPLUS

DN 144:451583

TI Structure-Property Relationships in Organic-Inorganic Nanomaterials Based on Methacryl-POSS and Dimethacrylate Networks

AU Bizet, Stephane; Galy, Jocelyne; Gerard, Jean-Francois

CS Laboratoire des Materiaux Macromoleculaires/IMP UMR CNRS 5627, Institut National des Sciences Appliquees de Lyon, Villeurbanne, F-69621, Fr.

SO Macromolecules (2006), 39(7), 2574-2583

CODEN: MAMOBX; ISSN: 0024-9297

PB American Chemical Society

DT Journal

LA English

AB Dimethacrylate-based networks were modified with well-defined organic-inorg. building blocks, i.e., polyhedral oligomeric silsesquioxanes (POSS). POSS were incorporated in the polymer networks either as dangling chains or as crosslinking points. For this purpose, the POSS functionality was varied. The influence of the structure of the organic substituent of the POSS cage was also investigated. The structure of the POSS-modified networks was determined by WAXS, TEM, and thermomech. anal. The POSS as a pendant unit on the network backbone shows a strong tendency toward aggregation and crystallization, depending on the nature of the organic ligands. The POSS-POSS interaction was found to be the main parameter governing the network morphol. However, dynamic mech. properties remain nearly at the same level as the neat matrix. Multifunctional POSS shows a higher miscibility with the dimethacrylate monomer and disperses very well in the cured network. As expected, the rubbery modulus grows with increasing amts. of POSS according to the high functionality of these addnl. cross-links, whereas the glass transition temperature remains constant It is also

demonstrated

that if the polymerization occurs at high temperature, the distribution of relaxation

times is reduced and more homogeneous hybrid networks, in terms of mol. mobility, are obtained.

CC 38-3 (Plastics Fabrication and Uses)

ST POSS org inorg nanomaterial structure property relationship; silsesquioxane cage polymer org inorg nanomaterial

IT Mechanical properties

(dynamic; structure-property relationships in organic-inorg. nanomaterials based on methacryl-POSS and dimethacrylate networks)

IT Hybrid organic-inorganic materials

Miscibility

Nanocomposites

(structure-property relationships in organic-inorg. nanomaterials based on methacryl-POSS and dimethacrylate networks)

IT Silsesquioxanes

RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)

(structure-property relationships in organic-inorg. nanomaterials based on methacryl-POSS and dimethacrylate networks)

IT 885479-88-9P 885479-89-0P 885479-90-3P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(structure-property relationships in organic-inorg. nanomaterials based on methacryl-POSS and dimethacrylate networks)

IT 885479-88-9P 885479-89-0P 885479-90-3P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(structure-property relationships in organic-inorg. nanomaterials based on methacryl-POSS and dimethacrylate networks)

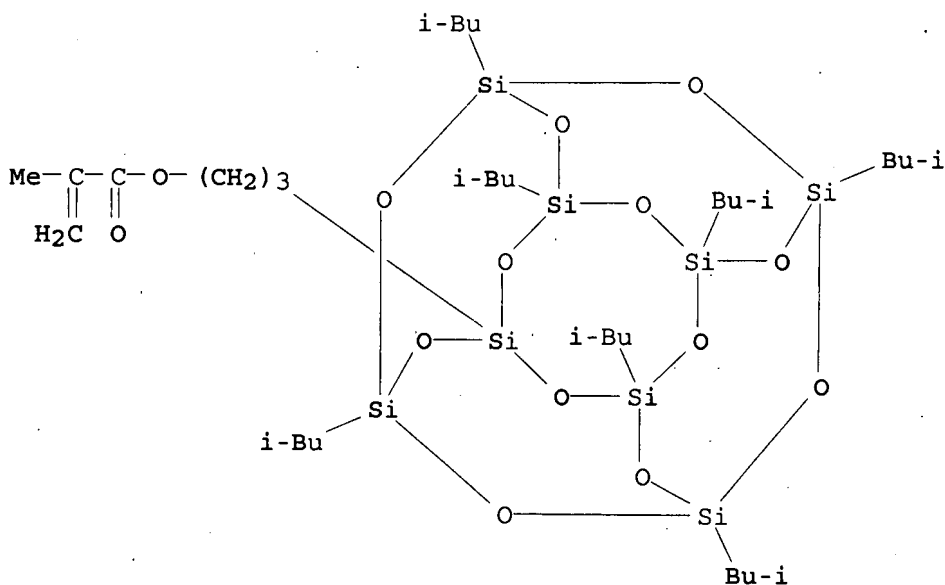
RN 885479-88-9 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis(4,1-phenyleneoxy-2,1-ethanediyl) ester, polymer with cyclohexyl 2-methyl-2-propenoate and 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl]propyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 307531-94-8

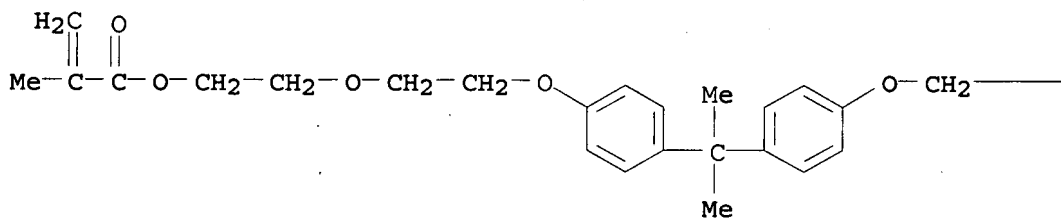
CMF C35 H74 O14 Si8



CM 2

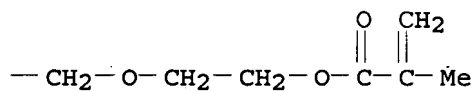
CRN 56744-60-6

CMF C31 H40 O8



PAGE 1-A

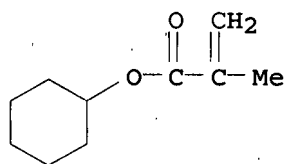
PAGE 1-B



CM 3

CRN 101-43-9

CMF C10 H16 O2



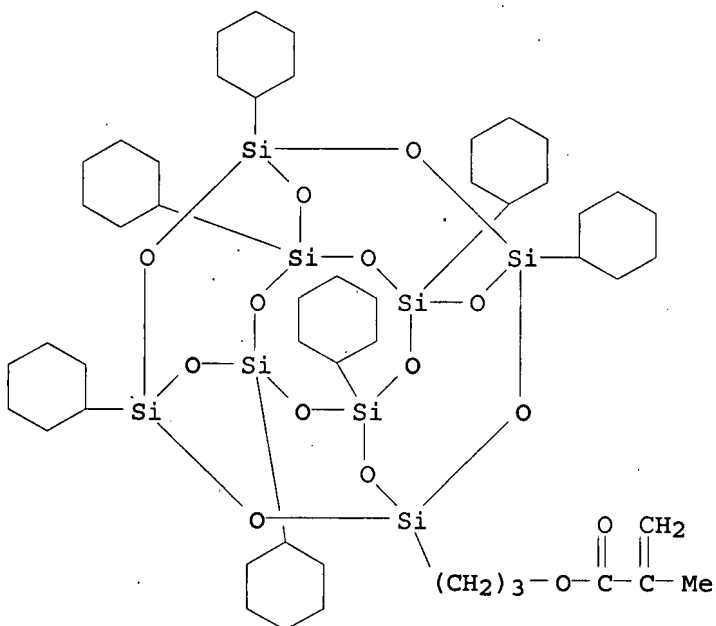
RN 885479-89-0 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis(4,1-phenyleneoxy-2,1-ethanediyl) ester, polymer with cyclohexyl 2-methyl-2-propenoate and 3-(heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-90-6

CMF C49 H88 O14 Si8

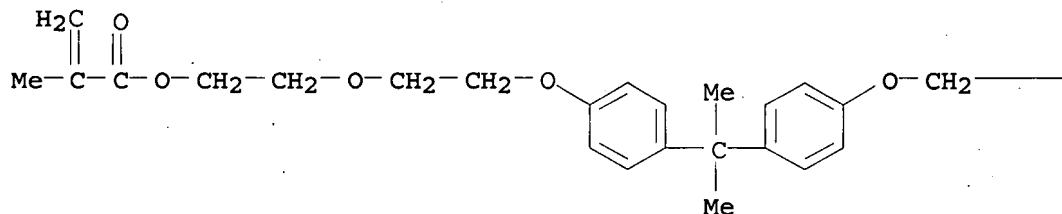


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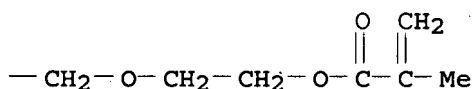
CRN 56744-60-6

CMF C31 H40 O8

PAGE 1-A



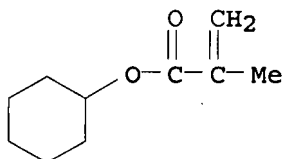
PAGE 1-B



CM 3

CRN 101-43-9

CMF C10 H16 O2



RN 885479-90-3 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-octaylocta-3,1-propanediyl ester, polymer with (1-methylethylidene)bis(4,1-phenyleneoxy-2,1-ethanediyl)bis(2-methyl-2-propenoate) (9CI) (CA INDEX NAME)

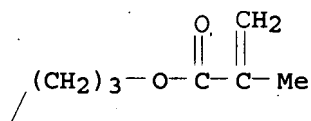
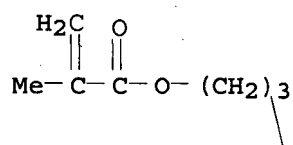
CM 1

CRN 622404-27-7

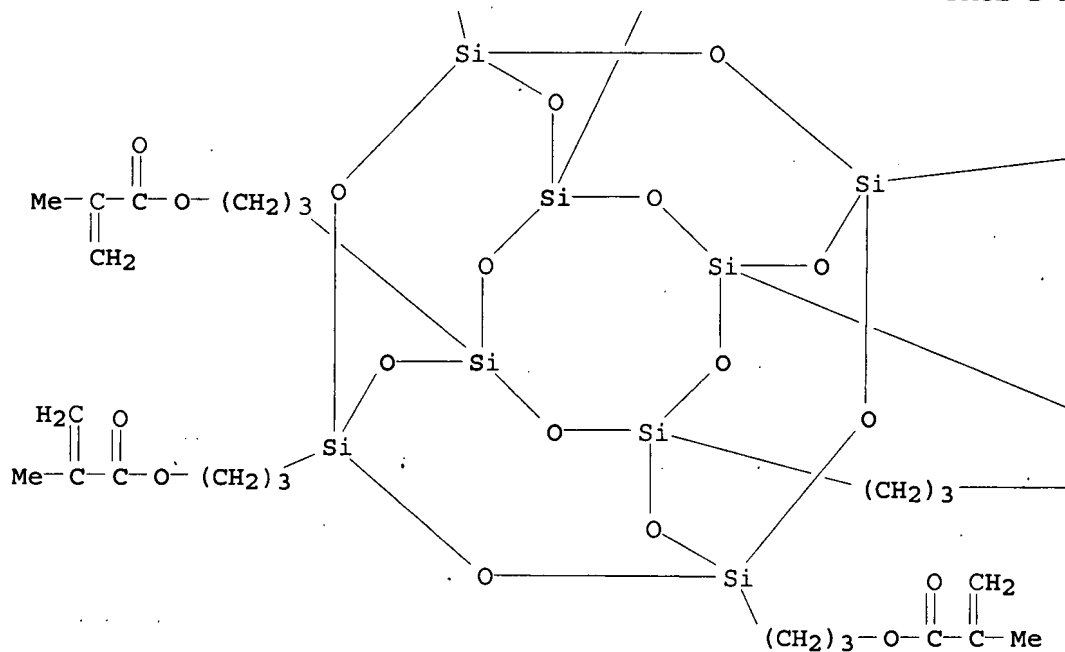
CMF C56 H88 O28 Si8

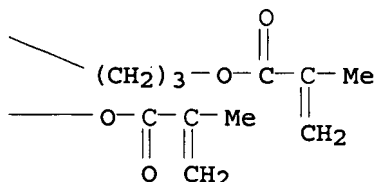
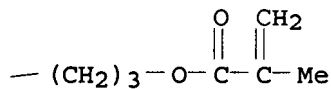


PAGE 1-A



PAGE 2-A



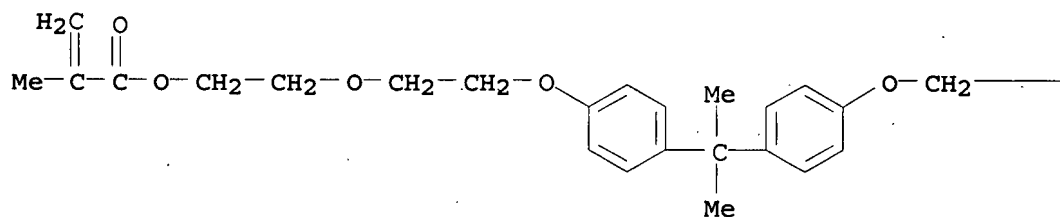


CM 2

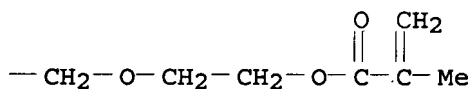
CRN . 56744-60-6

CMF C31 H40 O8

PAGE 1-A



PAGE 1-B



RE.CNT 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 6 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:812440 HCAPLUS

DN 143:347228

TI    Modification and characterization of Si-based nanobuilding blocks  
precursors for hybrid materials

AU Mammeri, Fayna; Douja, Najiba; Bonhomme, Christian; Ribot, Francois;  
Babonneau, Florence; Dire, Sandra

KATHLEEN FULLER EIC1700 571/272-2505

CS Dipartimento di Ingegneria dei Materiali e Tecnologie Industriali,  
Universita di Trento, Trento, 38050, Italy

SO Materials Research Society Symposium Proceedings (2005), Volume Date 2004,  
847(Organic/Inorganic Hybrid Materials--2004), 363-368  
CODEN: MRSPDH; ISSN: 0272-9172

PB Materials Research Society

DT Journal

LA English

AB New functional nanobuilding blocks were successfully synthesized by  
hydrosilylation of unsatd. alcs. with dimethylsiloxo isobutyl-POSS and  
further acylation with methacryloyl chloride. The solvent influence on  
the reaction pathway was studied, and reaction steps and final  
nano-objects were characterized using multinuclear NMR and FTIR  
spectroscopy. The organic spacer chain length between the inorg. cage and  
the reactive methacrylate function was changed to modify the reactivity of  
the final functional nanobuilding block in the polymerization process.

CC 29-6 (Organometallic and Organometalloidal Compounds)

ST hydrosilylation unsatd alc dimethylsiloxo polyhedral oligomeric  
silsesquioxane Karstedt catalyst

IT Hydrosilylation  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

IT Cage compounds  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

IT Acylation  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst followed by  
acylation)

IT NMR (nuclear magnetic resonance)  
(multinuclear; hydrosilylation of unsatd. alcs. with dimethylsiloxo  
polyhedral oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

IT Alcohols, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(unsatd.; hydrosilylation of unsatd. alcs. with dimethylsiloxo  
polyhedral oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

IT 424822-08-2  
RL: CAT (Catalyst use); USES (Uses)  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

IT 107-18-6, Allyl alcohol, reactions 821-09-0, 4-Penten-1-ol 920-46-7,  
Methacryloyl chloride 701301-39-5  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

IT 866034-88-0P 866034-89-1P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
(Reactant or reagent)  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

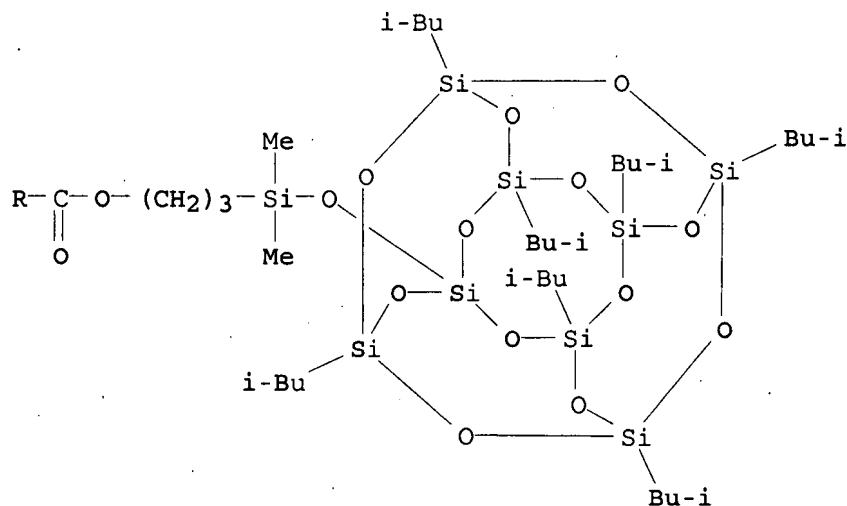
IT 866034-86-8P 866034-87-9P 866034-90-4P 866034-91-5P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

IT 866034-90-4P 866034-91-5P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(hydrosilylation of unsatd. alcs. with dimethylsiloxo polyhedral  
oligomeric silsesquioxane catalyzed by Karstedt's catalyst)

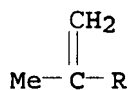
RN 866034-90-4 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[[[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl]oxy]dimethylsilyl]propyl ester (9CI) (CA INDEX NAME)

PAGE 1-A



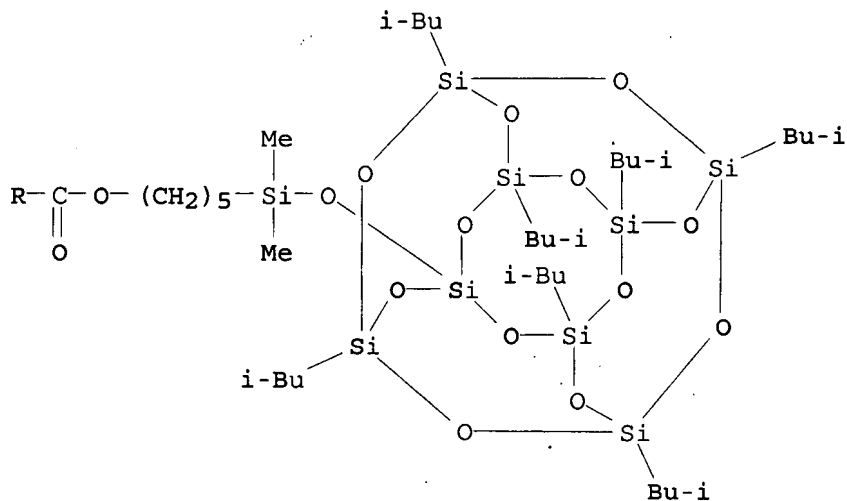
PAGE 2-A

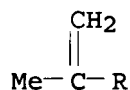


RN 866034-91-5 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 5-[[[heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl]oxy]dimethylsilyl]pentyl ester (9CI) (CA INDEX NAME)

PAGE 1-A





RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

- L37 ANSWER 7 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2005:733814 HCAPLUS  
DN 144:274608  
TI Block copolymer-derived nano-templated surfaces for investigation of nanophysics of wetting  
AU Intasanta, Narupol; Coughlin, E. Bryan; Russell, Thomas P.  
CS Department of Polymer Science and Engineering, University of Massachusetts Amherst, Amherst, MA, 01003, USA  
SO PMSE Preprints (2005), 93, 725-726  
CODEN: PPMRA9; ISSN: 1550-6703  
PB American Chemical Society  
DT Journal; (computer optical disk)  
LA English  
AB Organic-inorg. **hybrid** diblock copolymers of a polyhedral oligomeric silsesquioxane methacrylate (MAPOSS) and Me methacrylate (MMA) were prepared by atom transfer radical polymerization. The microphase separation of the block copolymers gave rise to organic-inorg. **hybrid** nanostructures with different morphologies. The surface-induced orientation of the nanostructures resulted in a nano-templated surface with height modulations corresponding to the domain sizes of the block copolymers. Thermolysis was used to erode the organic components and PMMA, while the inorg. component (POSS) was transformed into a silicon dioxide nanotemplate. Surface modification with various chlorosilanes provided means to study wetting phenomena of the nano-templated surfaces.
- CC 35-4 (Chemistry of Synthetic High Polymers)  
ST polyhedral oligomeric silsesquioxane methyl methacrylate block copolymer nanostructure; surface modified silica nanotemplate wetting investigation  
IT Wetting  
(block copolymer-derived nano-templated surfaces for investigation of)  
IT Templates  
(block copolymer-derived nano-templated surfaces for investigation of wetting)  
IT Polymer morphology  
(surface; block copolymer-derived nano-templated surfaces for investigation of wetting)  
IT 7631-86-9P, Silica, preparation **705926-41-6P**  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); **PREP (Preparation)**; PROC (Process)  
(block copolymer-derived nano-templated surfaces for investigation of wetting)  
IT 878204-84-3  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
(modifier for nano-templated silica surface; block copolymer-derived nano-templated surfaces for investigation of wetting)  
IT **705926-41-6P**  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical

process); SPN (Synthetic preparation); PREP (Preparation); PROC  
(Process)  
(block copolymer-derived nano-templated surfaces for investigation of  
wetting)

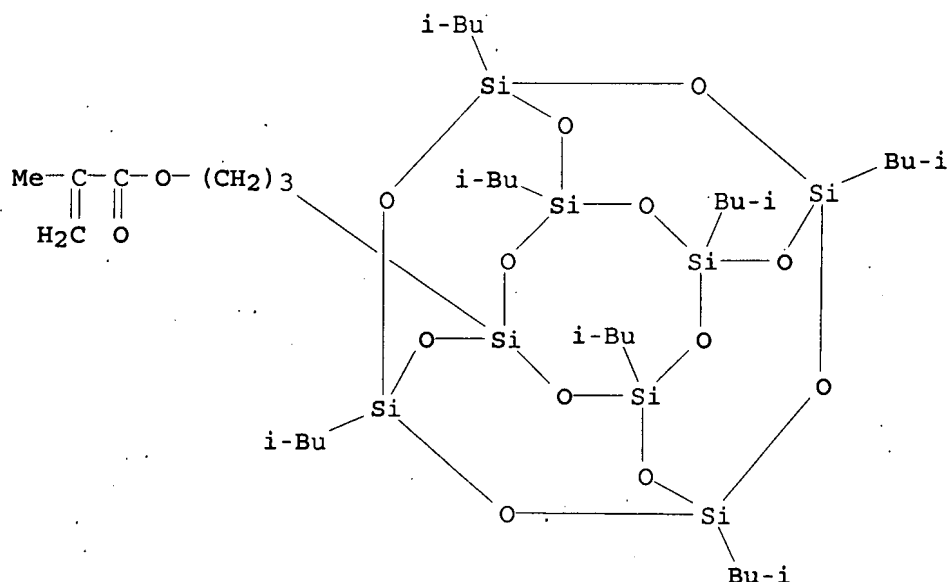
RN 705926-41-6 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.1  
3,9.15,15.17,13]octasiloxanyl]propyl ester, polymer with methyl  
2-methyl-2-propenoate, diblock (9CI) (CA INDEX NAME)

CM 1

CRN 307531-94-8

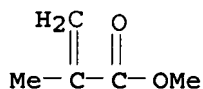
CMF C35 H74 O14 Si8



CM 2

CRN 80-62-6

CMF C5 H8 O2



RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 8 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:229125 HCAPLUS

DN 142:464109

TI Synthesis of the Organic/Inorganic Hybrid Star Polymers and  
Their Inclusion Complexes with Cyclodextrins

AU Chan, Shih-Chi; Kuo, Shiao-Wei; Chang, Feng-Chih

CS Institute of Applied Chemistry, National Chiao Tung University, Hsin Chu,

KATHLEEN FULLER EIC1700 571/272-2505

Taiwan  
SO Macromolecules (2005), 38(8), 3099-3107  
CODEN: MAMOBX; ISSN: 0024-9297  
PB American Chemical Society  
DT Journal  
LA English  
AB In this study, we synthesized a series of the organic/inorg. **hybrid** star PCLs. These star PCLs can form inclusion complexes (ICs) with  $\alpha$ - and  $\gamma$ -CD, but not with  $\beta$ -CD. These CD ICs were characterized by XRD, solid-state  $^{13}\text{C}$  CP/MAS NMR spectroscopy,  $^1\text{H}$  NMR spectroscopy, FT-IR spectroscopy, DSC, and TGA. Our results suggest that the PCL chains of these star polymers lose their original crystalline properties and were included inside the channels provided by the CDs to form a columnar crystalline structures. The stoichiometries (PCL:CD) that we determined by  $^1\text{H}$  NMR spectroscopy for all of the ICs with  $\alpha$ - or  $\gamma$ -CD are higher than those of the corresponding CD/linear PCL ICs because of the steric hindrance around the bulky POSS core, which causes some of the  $\epsilon$ -caprolactone units near the core to be free from complexation with the CDs. From these analyses, we proposed some possible structures for the CD/star PCL ICs.  
CC 35-7 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 44  
ST **hybrid** star polycaprolactone inclusion complex cyclodextrin  
IT Polyesters, preparation  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(caprolactone-based; preparation of organic-inorg. **hybrid** star polycaprolactones and their inclusion complexes with cyclodextrins)  
IT 851588-81-3P 851588-82-4P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(preparation and characterization of)  
IT 851588-79-9P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(preparation and desilylation of)  
IT 85807-85-8P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(preparation and reaction with octakis(dimethylsilyloxy)pentacyclooctasiloxane)  
IT 288290-32-4P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(preparation as core for star polycaprolactone)  
IT 851588-80-2P 851591-26-9P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(preparation of organic-inorg. **hybrid** star polycaprolactones and their inclusion complexes with cyclodextrins)  
IT 18162-48-6, tert-Butyldimethylsilyl chloride  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction with allyl alc.)  
IT 107-18-6, Allyl alcohol, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction with tert-butyldimethylsilyl chloride)  
IT 125756-69-6  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(silylation with (tert-Butyldimethylsilyloxy)propylene)  
IT 851588-81-3P 851588-82-4P  
RL: SPN (Synthetic preparation); PREP (Preparation)

(preparation and characterization of)

RN 851588-81-3 HCAPLUS

CN  $\alpha$ -Cyclodextrin, compd. with  $\alpha, \alpha', \alpha'', \alpha'''$ , .a  
lpha.'''', $\alpha''''$ , $\alpha''''$ , $\alpha''''$ , $\alpha''''$

[pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-  
octayloctakis[oxy(dimethylsilylene)-3,1-propanediyl]]octakis[ $\omega$ -  
hydroxypoly[oxy(1-oxo-1,6-hexanediyl)]] (9CI) (CA INDEX NAME)

CM 1

CRN 851588-80-2

CMF (C6 H10 O2)n (C6 H10 O2)n (C6 H10 O2)n (C6 H10 O2)n (C6 H10 O2)n (C6  
H10 O2)n (C6 H10 O2)n (C6 H10 O2)n C40 H104 O28 Si16

CCI PMS

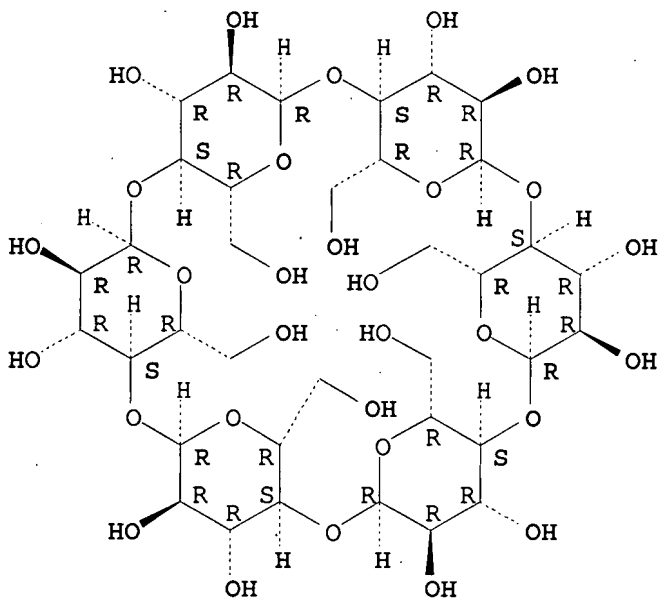
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CM 2

CRN 10016-20-3

CMF C36 H60 O30

Absolute stereochemistry.



RN 851588-82-4 HCAPLUS

CN  $\gamma$ -Cyclodextrin, compd. with  $\alpha, \alpha', \alpha'', \alpha'''$ , .a  
lpha.'''', $\alpha''''$ , $\alpha''''$ , $\alpha''''$ , $\alpha''''$

[pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-  
octayloctakis[oxy(dimethylsilylene)-3,1-propanediyl]]octakis[ $\omega$ -  
hydroxypoly[oxy(1-oxo-1,6-hexanediyl)]] (9CI) (CA INDEX NAME)

CM 1

CRN 851588-80-2

CMF (C6 H10 O2)n (C6 H10 O2)n (C6 H10 O2)n (C6 H10 O2)n (C6 H10 O2)n (C6  
H10 O2)n (C6 H10 O2)n (C6 H10 O2)n C40 H104 O28 Si16

CCI PMS

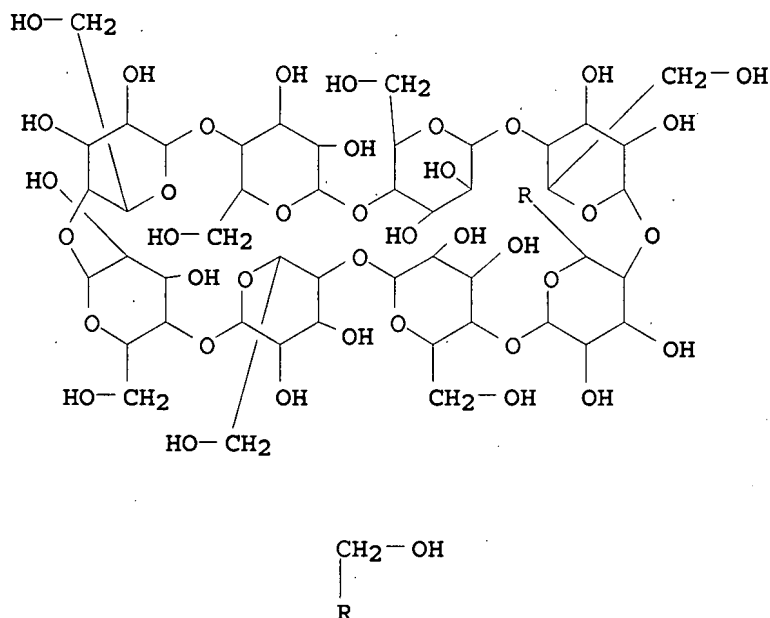


\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CM 2

CRN 17465-86-0

CMF C48 H80 O40



IT 851588-80-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP

(Preparation); RACT (Reactant or reagent)

(preparation of organic-inorg. hybrid star polycaprolactones and their inclusion complexes with cyclodextrins)

RN 851588-80-2 HCAPLUS

CN Poly[oxy(1-oxo-1,6-hexanediyl)],  $\alpha, \alpha', \alpha'', \alpha'''$ , .al

pha. ....,  $\alpha''''$ ,  $\alpha'''''$ ,  $\alpha''''''$ ,  $\alpha'''''''$  -

[pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-octayloctakis[oxy(dimethylsilylene)-3,1-propanediyl]]octakis[ $\omega$ -hydroxy- (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RE.CNT 56 THERE ARE 56 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 9 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:200878 HCAPLUS

DN 143:230270

TI Synthesis and cell viability studies of polyhedral oligosilsesquioxane - polycaprolactone hybrid materials

AU Skaria, Sunny; Schricker, Scott

CS College of Dentistry, The Ohio State University, Columbus, OH, 43210, USA

SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2005), 46(1), 94-95

CODEN: ACPPAY; ISSN: 0032-3934

PB American Chemical Society, Division of Polymer Chemistry

KATHLEEN FULLER EIC1700 571/272-2505

- DT Journal; (computer optical disk)  
 LA English  
 AB Polyhedral oligosilsesquioxane (POSS) containing biodegradable polymers were synthesized and characterized. Cytotoxicity expts. were carried out for human osteoblast and mouse muscle cell lines. The studies showed that these polymers could be used as possible tissue engineering scaffolds.  
 CC 35-4 (Chemistry of Synthetic High Polymers)  
 Section cross-reference(s): 1, 63  
 ST polyhedral oligosilsesquioxane polycaprolactone **hybrid** prep  
 cell viability  
 IT Animal cell line  
 (C2C12, viability; synthesis and cell viability studies of biodegradable polycaprolactone- and polyester-polyhedral oligosilsesquioxane **hybrid** materials)  
 IT Animal cell line  
 (MG63, viability; synthesis and cell viability studies of biodegradable polycaprolactone- and polyester-polyhedral oligosilsesquioxane **hybrid** materials)  
 IT Silsesquioxanes  
 RL: PAC (Pharmacological activity); PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
 (polyester-; synthesis and cell viability studies of biodegradable polycaprolactone- and polyester-polyhedral oligosilsesquioxane **hybrid** materials)  
 IT Polyesters, preparation  
 RL: PAC (Pharmacological activity); PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)  
 (silsesquioxane-; synthesis and cell viability studies of biodegradable polycaprolactone- and polyester-polyhedral oligosilsesquioxane **hybrid** materials)  
 IT Biodegradable materials  
 Human  
 Tissue engineering  
 (synthesis and cell viability studies of biodegradable polycaprolactone- and polyester-polyhedral oligosilsesquioxane **hybrid** materials)  
 IT 851588-80-2P 851591-26-9P, Octakis(3-hydroxypropyldimethylsiloxy)octasilsesquioxane-initiated  $\epsilon$ -caprolactone homopolymer 862667-09-2P, Octakis(3-hydroxypropyldimethylsiloxy)octasilsesquioxane-initiated L-lactide homopolymer, SRU 862799-02-8P, Octakis(3-hydroxypropyldimethylsiloxy)octasilsesquioxane-initiated L-lactide homopolymer  
 RL: PAC (Pharmacological activity); PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)  
 (multi-arm star; synthesis and cell viability studies of biodegradable polycaprolactone- and polyester-polyhedral oligosilsesquioxane **hybrid** materials)  
 IT 851588-80-2P 862667-09-2P, Octakis(3-hydroxypropyldimethylsiloxy)octasilsesquioxane-initiated L-lactide homopolymer, SRU  
 RL: PAC (Pharmacological activity); PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)  
 (multi-arm star; synthesis and cell viability studies of biodegradable polycaprolactone- and polyester-polyhedral oligosilsesquioxane **hybrid** materials)

RN 851588-80-2 HCAPLUS  
 CN Poly[oxy(1-oxo-1,6-hexanediyl)],  $\alpha, \alpha', \alpha'', \alpha'''$ , .al  
 pha.'''', $\alpha''''$ , $\alpha'''''$ , $\alpha''''''$ -  
 [pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-  
 octayloctakis[oxy(dimethylsilylene)-3,1-propanediyl]]octakis( $\omega$ -  
 hydroxy- (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 862667-09-2 HCAPLUS  
 CN Poly[oxy[(1S)-1-methyl-2-oxo-1,2-ethanediyl]],  
 $\omega, \omega', \omega'', \omega''', \omega''''$ , $\omega'''''$ , $\omega''''''$ , $\omega'''''''$   
 ', $\omega''''''''$ -[pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-  
 1,3,5,7,9,11,13,15-octayloctakis[oxy(dimethylsilylene)-3,1-  
 propanediyl]oxy]]octakis( $\alpha$ -hydro- (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 10 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
 AN 2005:106619 HCAPLUS  
 DN 142:355659  
 TI Organic-Inorganic Poly(Methyl Methacrylate) **Hybrids** with  
 Confined Polyhedral Oligosilsesquioxane Macromonomers  
 AU Toepfer, Oliver; Neumann, Daniel; Choudhury, Namita Roy; Whittaker,  
 Andrew; Matisons, Janis  
 CS Ian Wark Research Institute, ARC Special Research Centre, University of  
 South Australia, 5095, Australia  
 SO Chemistry of Materials (2005), 17(5), 1027-1035  
 CODEN: CMATEX; ISSN: 0897-4756  
 PB American Chemical Society  
 DT Journal  
 LA English  
 AB We herein report the synthesis of organic-inorg. **hybrid** poly(Me  
 methacrylate) containing polyhedral oligosilsesquioxanes.  
 Octakis(3-hydroxypropyldimethylsiloxy)octasilsesquioxane (OHPS) was  
 synthesized from octakis(hydridodimethylsiloxy)octasilsesquioxane  
 [Si8O12(OSiMe2H)8, Q8M8H] following literature procedures.  
 Octakis(methacryloxypropyldimethylsiloxy) octasilsesquioxane (OMPS) was  
 synthesized via the reaction of methacryloyl chloride or methacrylic acid  
 anhydride with OHPS, with the latter giving improved purity. Polymerization of  
 OMPS with Me methacrylate using a dibenzoyl peroxide initiator gave a  
 highly cross-linked polymer. Characterization of the polymer was  
 performed using Fourier transform IR spectroscopy, <sup>29</sup>Si NMR, differential  
 scanning calorimetry, thermogravimetric anal., atomic force microscopy, and  
 transmission electron microscopy with energy-dispersive X-ray anal. The  
 polymer was found to be largely homogeneous. Increasing the OMPS concentration  
 in  
 the polymer gave increased decomposition and glass transition temps.  
 CC 35-6 (Chemistry of Synthetic High Polymers)  
 ST org inorg polymethacrylate **hybrid** confined polyhedral  
 oligosilsesquioxane macromonomer  
 IT Glass transition temperature  
 Hybrid organic-inorganic materials  
 Polymer morphology  
 Thermal stability  
 (organic-inorg. poly(Me methacrylate) **hybrids** with confined  
 polyhedral oligosilsesquioxane macromonomers)  
 IT 849111-73-5P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP

(Preparation)  
 (organic-inorg. poly(Me methacrylate) hybrids with confined  
 polyhedral oligosilsesquioxane macromonomers)

IT 288290-34-6P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP  
 (Preparation); RACT (Reactant or reagent)  
 (preparation and polymerization with Me methacrylate)

IT 288290-32-4P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (preparation and reaction with methacryloyl chloride or methacrylic acid  
 anhydride)

IT 125756-69-6  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (reaction with allyl alc.)

IT 107-18-6, Allyl alcohol, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (reaction with octakis(dimethylsiloxy)pentacyclooctasiloxane)

IT 760-93-0, Methacrylic acid anhydride 920-46-7, Methacryloyl chloride  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (reaction with octakis(hydroxypropyldimethylsilyl)octasilsesquioxane)

IT 849111-73-5P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP  
 (Preparation)  
 (organic-inorg. poly(Me methacrylate) hybrids with confined  
 polyhedral oligosilsesquioxane macromonomers)

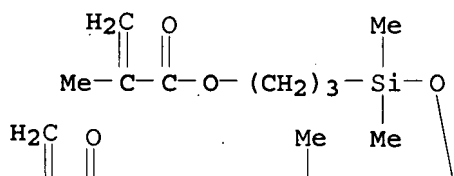
RN 849111-73-5 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan  
 e-1,3,5,7,9,11,13,15-octayloctakis[oxy(dimethylsilylene)-3,1-propanediyl]  
 ester, polymer with methyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

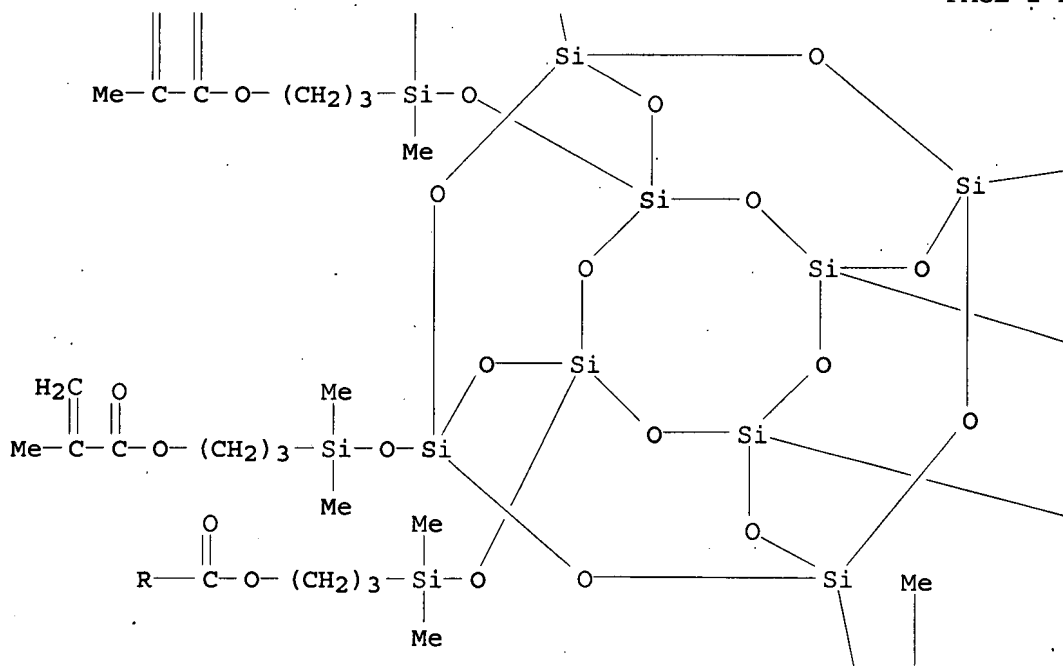
CM 1

CRN 288290-34-6  
 CMF C72 H136 O36 Si16

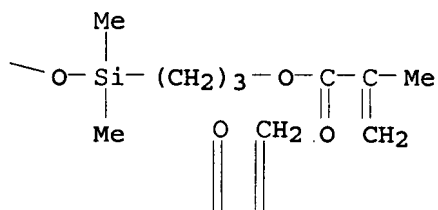
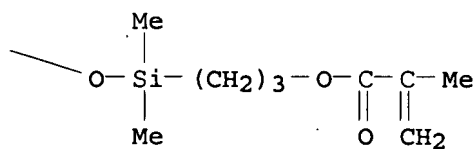
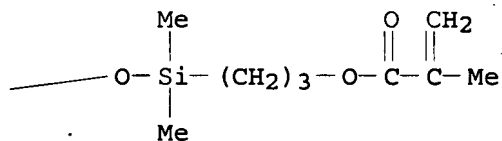
PAGE 1-A



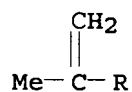
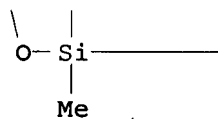
PAGE 2-A



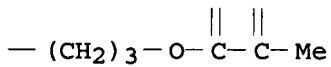
PAGE 2-B



PAGE 3-A



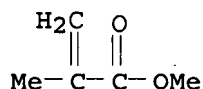
PAGE 3-B



CM 2

CRN 80-62-6

CMF C5 H8 O2



IT 288290-34-6P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP

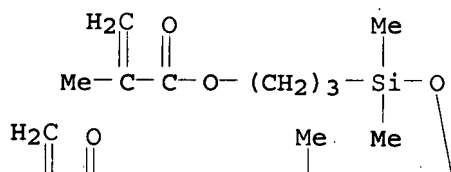
(Preparation); RACT (Reactant or reagent)

(preparation and polymerization with Me methacrylate)

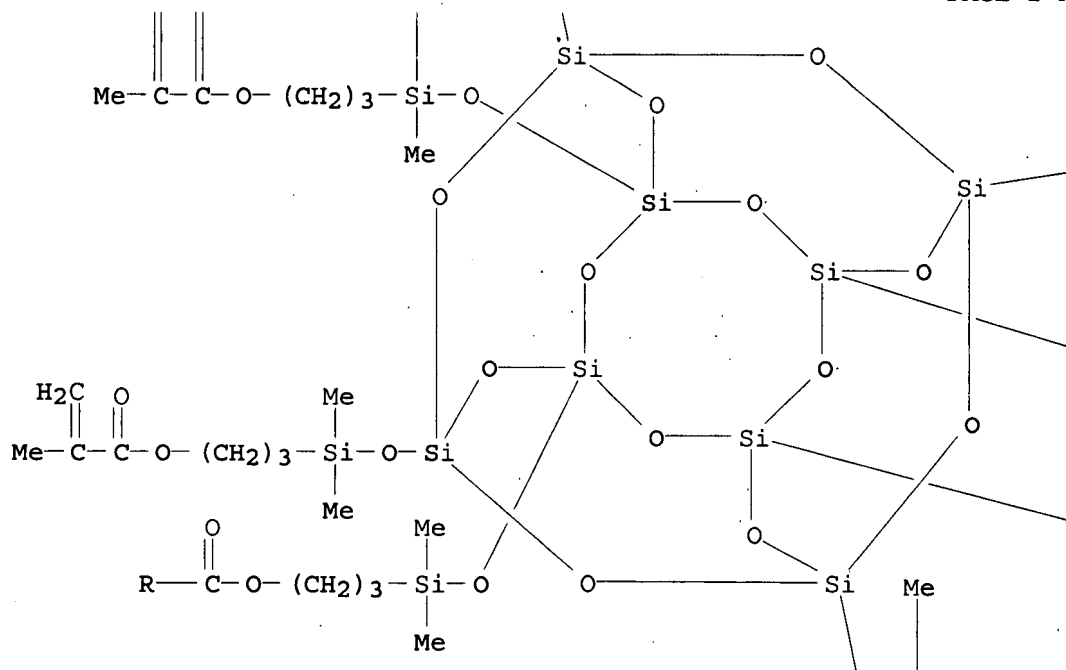
RN 288290-34-6 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-octayloctakis[oxy(dimethylsilylene)-3,1-propanediyl] ester (9CI) (CA INDEX NAME)

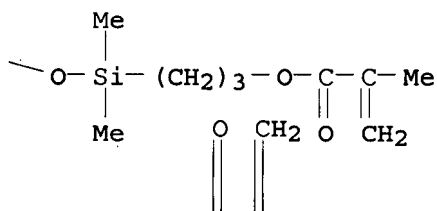
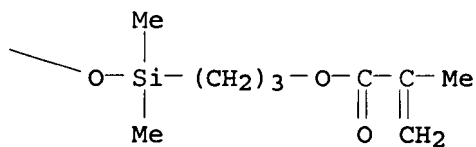
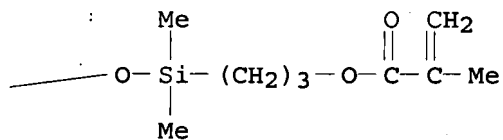
PAGE 1-A



PAGE 2-A

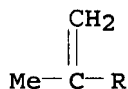
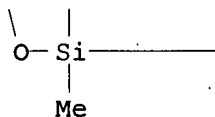


PAGE 2-B

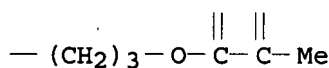




PAGE 3-A



PAGE 3-B



RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 11 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2005:74164 HCAPLUS

DN 142:178756

TI Polyurethane-polymer hybrid dispersion with enhanced surface  
properties, method for the production and utilization thereof.

IN Maier, Alois; Ingrisich, Stefan; Steidl, Norbert; Weinelt, Frank

PA Construction Research & Technology G.m.b.H., Germany

SO PCT Int. Appl., 46 pp.

CODEN: PIXXD2

DT Patent

LA German

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005007762	A1	20050127	WO 2004-EP7592	20040709
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	DE 10331484	A1	20050303	DE 2003-10331484	20030711
	EP 1656428	A1	20060517	EP 2004-740871	20040709
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK				
	US 2006189750	A1	20060824	US 2006-563903	20060106
PRAI	DE 2003-10331484	A	20030711		
	WO 2004-EP7592	W	20040709		
AB	Antisoiling, water-resistant, one- and two-component coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties (low critical surface stresses $\gamma_c$ and a				

very high contact angle  $\theta$ ) prepared by (a) producing a dispersion component (binder) based on an aqueous solution or dispersion of an optionally hydroxy and/or amino-functional polyurethane-polymer hybrid with optionally fluorinated side chains and optionally (b) crosslinking the resulting dispersion component. A dispersion of an optionally hydroxy and/or amino-functional polyurethane-polymer is prepared by reacting F-containing anionic-stabilized polyurethane dispersion with (meth)acrylic and aromatic monomers or polymerizing F-containing unsatd. monomers with other (meth)acrylic monomers. Thus, a radical polymerization of a mixture

containing 400 g

of F-modified polyurethane dispersion (having F-content 0.64 weight% and solid content 38%), 72.12 g of water, 20.27 g of Bu acrylate, 81.07 g of MMA and 1.27 g of an initiator 5 h at 80 - 85° gave a fluorinated polyurethane-polymer hybrid dispersion having solid content 45 weight%.

IC ICM C09D175-04

ICS C08G018-08; C08F283-00

CC 42-7 (Coatings, Inks, and Related Products)

ST antisoiling water resistant coating material fluorinated polyurethane hybrid dispersion; fluorine contg polyurethane dispersion methacrylic monomer polymn dispersion manuf

IT Polyurethanes, uses

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(acrylates, fluorine-containing, crosslinked coating; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT Coating materials

(antisoiling, water-resistant; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT Disperse systems

(aqueous; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT Fluoropolymers, reactions

Perfluoro compounds

RL: RCT (Reactant); RACT (Reactant or reagent)

(fluorinated polyurethane precursor; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT Polyurethanes, uses

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(perfluoroalkyl group-containing, acrylated; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT Fluoropolymers, uses

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyurethane-, acrylates, crosslinked coating; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT Fluoropolymers, uses

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyurethane-, perfluoroalkyl group-containing, acrylated; antisoiling, water-resistant coating materials based on fluorinated

polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT Acrylic polymers, uses

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyurethane-siloxane-, fluorine-containing, crosslinked coating; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

IT 80-62-6DP, Methyl methacrylate, reaction products with perfluoroalkyl group-containing polyurethanes 141-32-2DP, Butyl acrylate, reaction products with perfluoroalkyl group-containing polyurethanes 1996-88-9DP, 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-Heptadecafluorodecyl methacrylate, reaction products with perfluoroalkyl group-containing polyurethanes and acrylic monomers 2144-53-8DP, 3,3,4,4,5,5,6,6,7,7,8,8,8-Tridecafluorooctyl methacrylate, reaction products with perfluoroalkyl group-containing polyurethanes and acrylic monomers 307531-94-8DP, reaction products with perfluoroalkyl group-containing polyurethanes and acrylic monomers

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(crosslinked coating; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

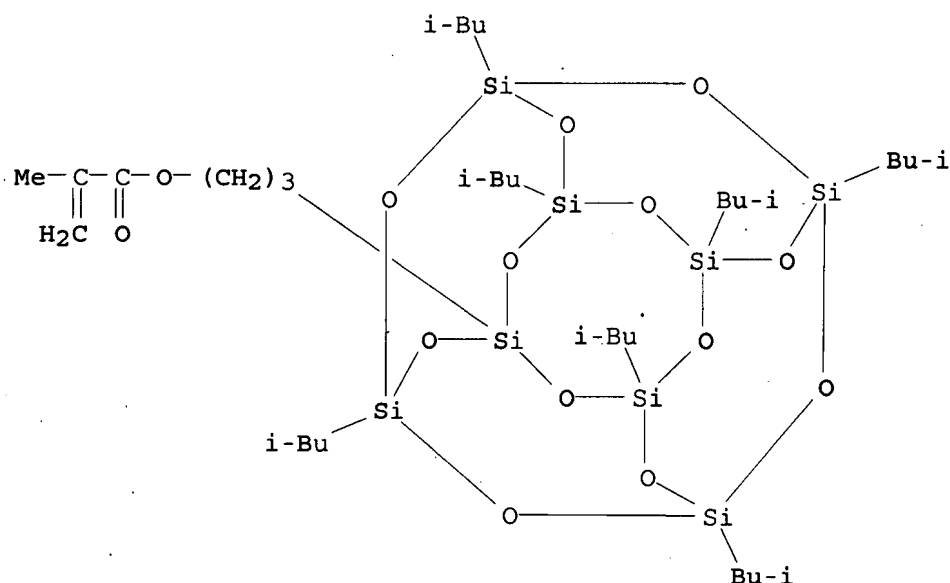
IT 307531-94-8DP, reaction products with perfluoroalkyl group-containing polyurethanes and acrylic monomers

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(crosslinked coating; antisoiling, water-resistant coating materials based on fluorinated polyurethane-polymer hybrid dispersion with enhanced surface properties)

RN 307531-94-8 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl]propyl ester (CA INDEX NAME)



RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 12 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2004:874865 HCAPLUS

DN 142:56733

TI Living Radical Polymerization by Polyhedral Oligomeric  
Silsesquioxane-Holding Initiators: Precision Synthesis of Tadpole-Shaped  
Organic/Inorganic Hybrid Polymers

AU Ohno, Kohji; Sugiyama, Satoshi; Koh, Kyoungmoo; Tsujii, Yoshinobu; Fukuda,  
Takeshi; Yamahiro, Mikio; Oikawa, Hisao; Yamamoto, Yasuhiro; Ootake,  
Nobumasa; Watanabe, Kenichi

CS Institute for Chemical Research, Kyoto University, Uji, Kyoto, 611-0011,  
Japan

SO Macromolecules (2004), 37(23), 8517-8522

CODEN: MAMOBX; ISSN: 0024-9297

PB American Chemical Society

DT Journal

LA English

AB Incompletely condensed polyhedral oligomeric silsesquioxane (POSS) with  
the highly reactive group of trisodium silanolate was used for the  
synthesis of two initiators for atom transfer radical polymerization, one with

a 2-bromoisobutyl group and the other with a chlorosulfonyl group. These  
initiators were applied to solution polymns. of styrene and Me methacrylate  
in the presence of a copper complex. In both systems, polymerization proceeded  
in a living fashion, as indicated by the first-order kinetics of monomer  
consumption, the evolution of mol. weight in direct proportion to monomer  
conversion, the good agreement of mol. weight with the theor. one, and the  
low polydispersity, thus providing tadpole-shaped polymers with an "inorg.  
head" of POSS and an "organic tail" of well-defined polymer.  
Thermogravimetric and differential scanning calorimetric studies showed  
that both thermal degradation and glass transition temps. of the organic/inorg.  
hybrid polymers with mol. wts. up to about 20 000 were enhanced as  
compared to those of model polymers without the POSS moiety.

CC 35-4 (Chemistry of Synthetic High Polymers)

ST polyhedral oligomeric silsesquioxane initiator prepn ATRP polymn

IT Polymerization catalysts

(atom transfer, living, radical; living radical polymerization by polyhedral  
oligomeric silsesquioxane-holding initiators: precision synthesis of  
Tadpole-shaped organic/inorg. hybrid polymers)

IT Hybrid organic-inorganic materials

(living radical polymerization by polyhedral oligomeric

silsesquioxane-holding

initiators: precision synthesis of Tadpole-shaped organic/inorg.  
hybrid polymers)

IT Silsesquioxanes

RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation);  
USES (Uses)

(living radical polymerization by polyhedral oligomeric

silsesquioxane-holding

initiators: precision synthesis of Tadpole-shaped organic/inorg.  
hybrid polymers)

IT Glass transition temperature

Molecular weight

Polydispersity

(of Tadpole-shaped organic/inorg. hybrid polymers)

IT Polymer degradation

(temperature; of Tadpole-shaped organic/inorg. hybrid polymers)

IT 660392-78-9P

RL: CAT (Catalyst use); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)  
(in preparation of living radical polymerization polyhedral oligomeric silsesquioxane-holding initiators)

IT 18204-80-3 20769-85-1 79793-00-3 476635-00-4  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(in preparation of living radical polymerization polyhedral oligomeric silsesquioxane-holding initiators)

IT 757198-90-6P 757199-15-8P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(in preparation of living radical polymerization polyhedral oligomeric silsesquioxane-holding initiators)

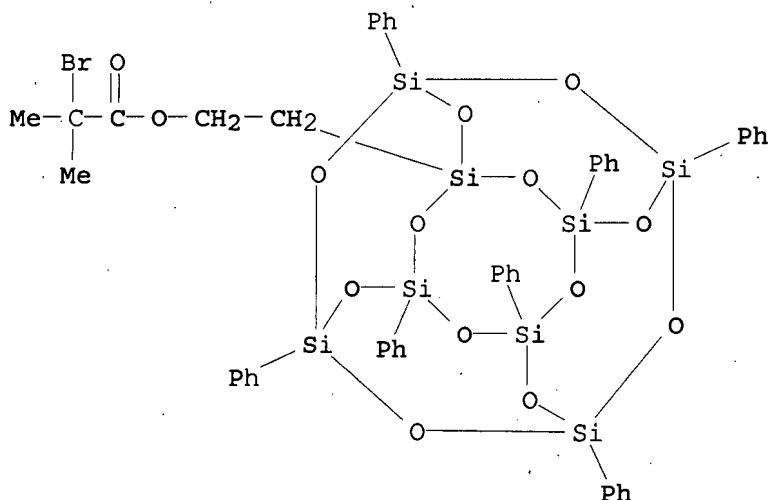
IT 757199-48-7P  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(preparation of living radical polymerization polyhedral oligomeric silsesquioxane-holding initiators)

IT 9003-53-6P, Polystyrene 9011-14-7P, Poly(methyl methacrylate)  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation).  
(synthesis of Tadpole-shaped organic/inorg. hybrid polymers catalyzed by polyhedral oligomeric silsesquioxane-holding initiators)

IT 757199-48-7P  
RL: CAT (Catalyst use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(preparation of living radical polymerization polyhedral oligomeric silsesquioxane-holding initiators)

RN 757199-48-7 HCAPLUS

CN Propanoic acid, 2-bromo-2-methyl-, 2-(3,5,7,9,11,13,15-heptaphenylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)ethyl ester (9CI) (CA INDEX NAME)



RE.CNT 41 THERE ARE 41 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 13 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2004:230854 HCAPLUS  
DN 141:54760  
TI Ultrathin films of self-assembled organic-inorganic hybrid

nanoparticle block copolymers

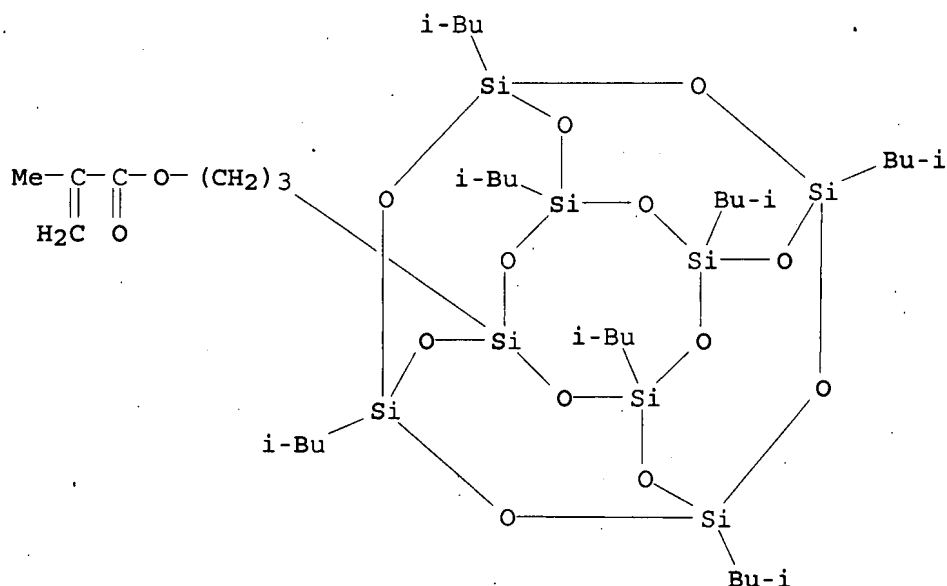
AU Intasanta, Narupol; Russell, Thomas P.; Coughlin, E. Bryan  
 CS Department of Polymer Science and Engineering, University of  
 Massachusetts, Amherst, MA, 01003, USA  
 SO PMSE Preprints (2004), 90, 260-261  
 CODEN: PPMRA9; ISSN: 1550-6703  
 PB American Chemical Society  
 DT Journal; (computer optical disk)  
 LA English  
 AB [3-(3,5,7,9,11,13,15-Heptaisobutylpentacyclo-9.5.1.13,9.15,15.17,13)octasi  
 loxan-1-yl]propyl methacrylate [poly(methacrylate-polyhedral oligomeric  
 silsesquioxane (POSS)-(isobutyl)-b-Me methacrylate)] **hybrids** of  
 mass fraction 60:40 based on PMMA:POSS(i-Butyl), with a PDI of 1.3, and  
 number average mol. weight of 40k was prepared by atom transfer radical  
 polymerization The  
 preparation of P[MAPOSS(1-butyl)-b-MMA] was possible by the sequential  
 polymerization  
 of the inorg. block first followed by the organic domain. Small angle x-ray  
 scattering (SAXS) data show that these **hybrid** diblock copolymers  
 have a long period spacing of 25 nm. Studies by atomic force microscopy  
 clearly show cylindrical morphol. The cylindrical domains lie parallel to  
 the substrate at the air/polymer interface. Modification of the silicon  
 oxide sub-surface with a neutral brush copolymer results in **hybrid**  
 block copolymer cylinders oriented perpendicular to the substrate. UV  
 irradiation results in selective decomposition of the PMMA domain and allows  
 for  
 removal of the parallel layer by acetic acid rinse. The cylinders  
 oriented perpendicular to the surface undergo oxygen plasma conversion of  
 the silsesquioxane domains into nano-patterned silicon oxide nanoarrays.  
 CC 35-8 (Chemistry of Synthetic High Polymers)  
 Section cross-reference(s): 36, 76  
 ST methyl methacrylate cyclooctasiloxane propyl **hybrid** block  
 copolymer prepn; self assembly **hybrid** cyclosiloxane methacrylate  
 block copolymer morphol orientation; silsesquioxane domain oxygen plasma  
 reaction silica array nanopattern array  
 IT Polymer morphology  
 (phase; preparation of silica nanoarrays by decomposition of prepared  
 ultrathin  
 films of self-assembled **hybrid** cyclosiloxane-methacrylate  
 block copolymer nanoparticles)  
 IT **Hybrid** organic-inorganic materials  
 Molecular orientation  
 Self-assembly  
 (preparation of silica nanoarrays by decomposition of prepared ultrathin  
 films of  
 self-assembled **hybrid** cyclosiloxane-methacrylate block  
 copolymer nanoparticles)  
 IT Polymer degradation  
 (radiochem.; preparation of silica nanoarrays by decomposition of prepared  
 ultrathin films of self-assembled **hybrid** cyclosiloxane-  
 methacrylate block copolymer nanoparticles)  
 IT Nanoparticles  
 (silica nanoarrays; preparation of silica nanoarrays by decomposition of  
 prepared  
 ultrathin films of self-assembled **hybrid** cyclosiloxane-  
 methacrylate block copolymer nanoparticles)  
 IT 25034-86-0, Methyl methacrylate-styrene copolymer  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (brush polymer, surface layer on substrate; preparation of silica nanoarrays  
 by decomposition of prepared ultrathin films of self-assembled **hybrid**

cyclosiloxane-methacrylate block copolymer nanoparticles)  
 IT 7758-89-6, Copper chloride (CuCl)  
 RL: CAT (Catalyst use); USES (Uses)  
 (preparation of silica nanoarrays by decomposition of prepared ultrathin  
 films of  
 self-assembled **hybrid** cyclosiloxane-methacrylate block  
 copolymer nanoparticles)  
 IT 705926-41-6P  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
 process); PRP (Properties); SPN (Synthetic preparation); **PREP**  
 (**Preparation**); PROC (Process)  
 (preparation of silica nanoarrays by decomposition of prepared ultrathin  
 films of  
 self-assembled **hybrid** cyclosiloxane-methacrylate block  
 copolymer nanoparticles)  
 IT 64-19-7, Acetic acid, uses  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (rinsing agent for removal of degraded PMMA phase; preparation of silica  
 nanoarrays by decomposition of prepared ultrathin films of self-assembled  
**hybrid** cyclosiloxane-methacrylate block copolymer  
 nanoparticles)  
 IT 7631-86-9P, Silicon oxide, preparation  
 RL: NUU (Other use, unclassified); PRP (Properties); SPN (Synthetic  
 preparation); **PREP** (Preparation); USES (Uses)  
 (substrate and patterned array; preparation of silica nanoarrays by  
 decomposition  
 of prepared ultrathin films of self-assembled **hybrid**  
 cyclosiloxane-methacrylate block copolymer nanoparticles)  
 IT 705926-41-6P  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
 process); PRP (Properties); SPN (Synthetic preparation); **PREP**  
 (**Preparation**); PROC (Process)  
 (preparation of silica nanoarrays by decomposition of prepared ultrathin  
 films of  
 self-assembled **hybrid** cyclosiloxane-methacrylate block  
 copolymer nanoparticles)  
 RN 705926-41-6 HCAPLUS  
 CN 2-Propenoic acid, 2-methyl-, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.1  
 3,9.15,15.17,13]octasiloxanyl]propyl ester, polymer with methyl  
 2-methyl-2-propenoate, diblock (9CI) (CA INDEX NAME)

CM 1

CRN 307531-94-8

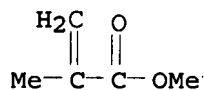
CMF C35 H74 O14 Si8



CM 2

CRN 80-62-6

CMF C5 H8 O2



RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 14 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2003:384332 HCAPLUS  
DN 139:180690  
TI Organic-inorganic **hybrid** gels having functionalized silsesquioxanes  
AU Kim, Kyung-Min; Chujo, Yoshiki  
CS Department of Polymer Chemistry, Graduate School of Engineering, Kyoto University, Kyoto, 606-8501, Japan  
SO Journal of Materials Chemistry (2003), 13(6), 1384-1391  
CODEN: JMACEP; ISSN: 0959-9428  
PB Royal Society of Chemistry  
DT Journal  
LA English  
AB **Hybrid** terpolymers consisting of polyhedral oligomeric silsesquioxanes (POSS), N,N-dimethylacrylamide, and bipyridine monomer were synthesized by a common radical polymerization method and their structures and thermal properties were studied by FT-IR, <sup>1</sup>H NMR, DSC, TGA. The thermal stabilities of the **hybrid** terpolymers increased on increasing the content of POSS in the feed ratio. New **hybrid** gels containing POSS were prepared through the coordination of various metal ions to 2,2'-bipyridine-modified **hybrid** terpolymers. Highly

KATHLEEN FULLER EIC1700 571/272-2505



concentrated solns. of terpolymers with iron(ii) sulfate or ruthenium(iii) chloride gave **hybrid** gels in good yields. No **hybrid** gel was formed with nickel(ii) chloride even at much higher concns. of nickel ions due to rapid ligand exchange reactions causing the polymer network to disappear as a result of a change in the nature of the coordination bonds from an intermol. network to an intramol. network. The degree of swelling and the thermal stability of the gels in various solvents were dependent on the content of POSS moiety in the **hybrid** gel and the ruthenium gel was considerably more stable than the iron and nickel gels. The **hybrid** gels containing POSS had properties characteristic of hydrogels and those of lipogel depending on the content of POSS in the **hybrid** gel. By anal. of the degree of swelling, the amount of POSS moiety in the **hybrid** gel has a significant effect on the degree of swelling in this system.

- CC 37-3 (Plastics Manufacture and Processing)
- ST functionalized silsesquioxane terpolymer prepn org inorg **hybrid** gel
- IT Silsesquioxanes  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)  
 (acrylic; preparation of organic-inorg. **hybrid** gels from terpolymer containing functionalized silsesquioxanes in the presence of metal ions)
- IT Differential thermal analysis  
 Polymer morphology  
 Swelling, physical  
 Thermal stability  
 Thermogravimetric analysis  
 (of **hybrid** gels formed from terpolymer containing functionalized silsesquioxanes in the presence of metal ions)
- IT Glass transition temperature  
 (of organic-inorg. **hybrid** terpolymer containing functionalized silsesquioxanes and **hybrid** gels therefrom in the presence of metal ion)
- IT Gelation  
 (of organic-inorg. **hybrid** terpolymer containing functionalized silsesquioxanes in the presence of metal ion)
- IT Gels  
**Hybrid** organic-inorganic materials  
 (preparation of organic-inorg. **hybrid** gels from terpolymer containing functionalized silsesquioxanes in the presence of metal ions)
- IT 95314-35-5P 183387-28-2P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (in preparation of **hybrid** terpolymer containing functionalized silsesquioxanes for organic-inorg. gels)
- IT 74173-48-1P 387820-81-7P  
 RL: RCT (Reactant); SPN (Synthetic preparation); **PREP** (**Preparation**); RACT (Reactant or reagent)  
 (monomer; in preparation of **hybrid** terpolymer containing functionalized silsesquioxanes for organic-inorg. gels)
- IT 579470-10-3P  
 RL: PRP (Properties); SPN (Synthetic preparation); **PREP** (**Preparation**)  
 (preparation of **hybrid** terpolymer containing functionalized silsesquioxanes for organic-inorg. **hybrid** gels)
- IT 7439-89-6DP, Iron, complex with silsesquioxane- and bipyridine-containing terpolymer 7440-02-0DP, Nickel, complex with silsesquioxane- and bipyridine-containing terpolymer 7440-18-8DP, Ruthenium, complex with silsesquioxane- and bipyridine-containing terpolymer 579470-10-3DP,

complex with metal ions

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**; PROC (Process)

(preparation of organic-inorg. **hybrid** gels from terpolymer containing functionalized silsesquioxanes in the presence of metal ions)

IT 1134-35-6, 4,4'-Dimethyl-2,2'-bipyridine 14579-03-4,  
Cyclopentyltrichlorosilane 38595-89-0, (3-Acryloxypropyl)trichlorosilane

RL: RCT (Reactant); RACT (Reactant or reagent)

(reactant for monomer; in preparation of **hybrid** terpolymer containing functionalized silsesquioxanes for organic-inorg. gels)

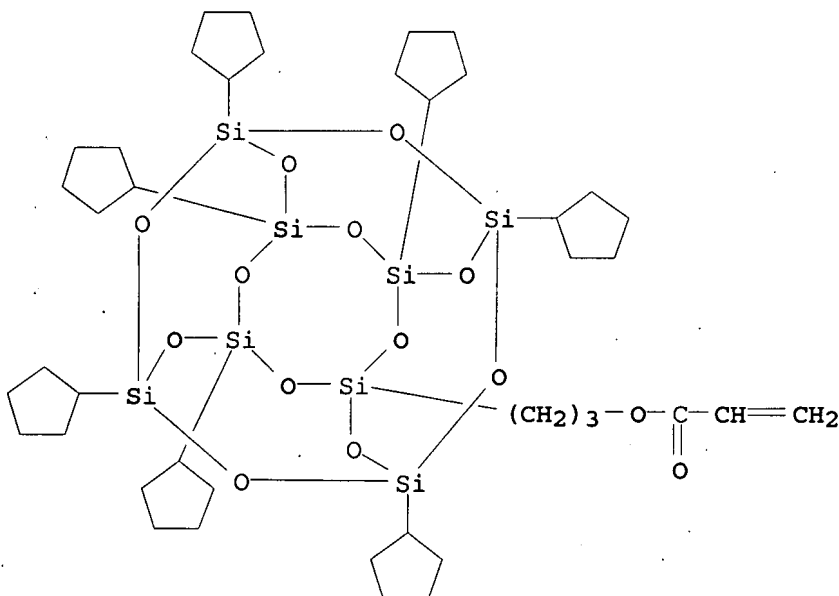
IT 387820-81-7P

RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)

(monomer; in preparation of **hybrid** terpolymer containing functionalized silsesquioxanes for organic-inorg. gels)

RN 387820-81-7 HCAPLUS

CN 2-Propenoic acid, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)



IT 579470-10-3P

RL: PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**

(preparation of **hybrid** terpolymer containing functionalized silsesquioxanes for organic-inorg. **hybrid** gels)

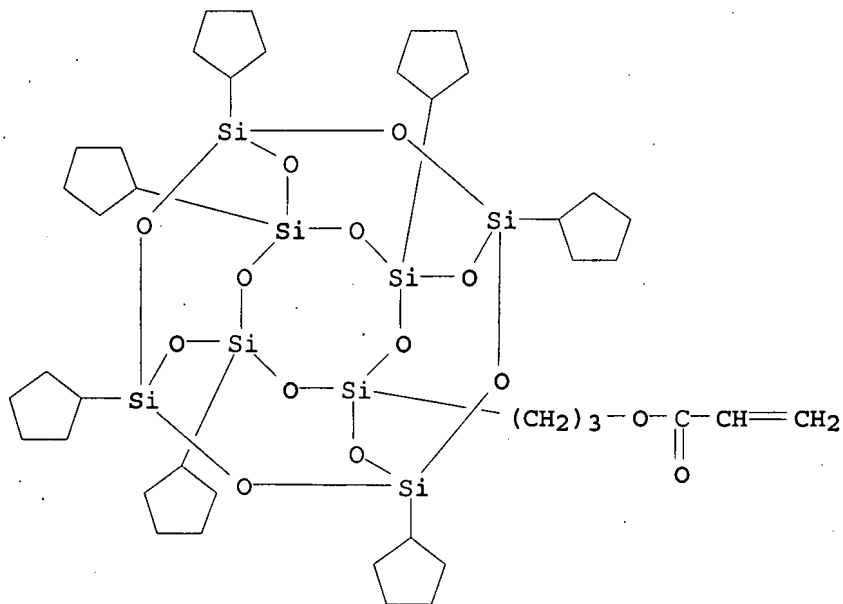
RN 579470-10-3 HCAPLUS

CN 2-Propenoic acid, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with N,N-dimethyl-2-propenamide and 4-ethenyl-4'-methyl-2,2'-bipyridine (9CI) (CA INDEX NAME)

CM 1

CRN 387820-81-7

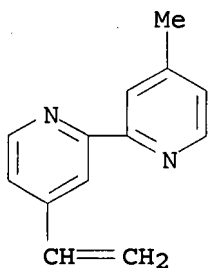
CMF C41 H72 O14 Si8



CM 2

CRN 74173-48-1

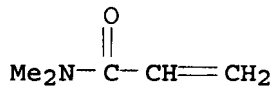
CMF C13 H12 N2



CM 3

CRN 2680-03-7

CMF C5 H9 N O



IT 579470-10-3DP, complex with metal ions

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)

(preparation of organic-inorg. hybrid gels from terpolymer containing functionalized silsesquioxanes in the presence of metal ions)

KATHLEEN FULLER EIC1700 571/272-2505

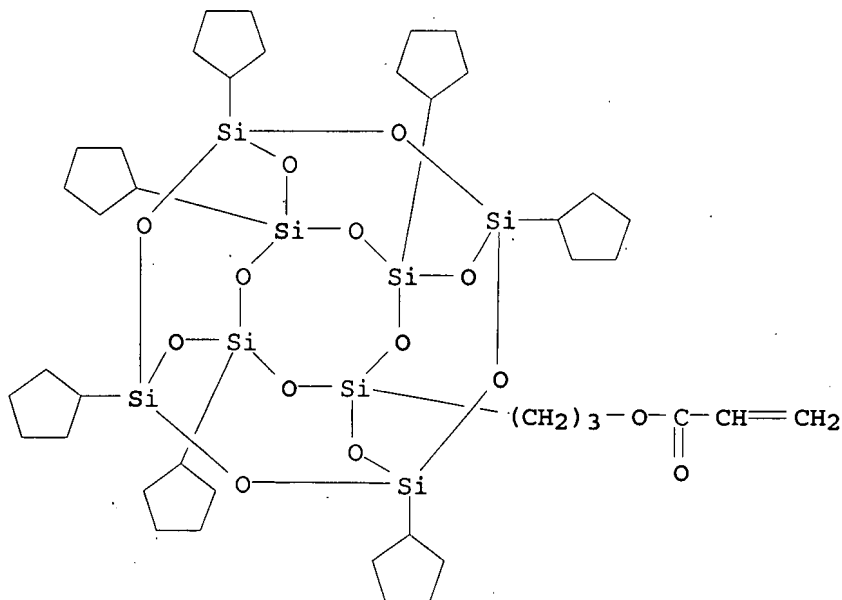
RN 579470-10-3 HCAPLUS

CN 2-Propenoic acid, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with N,N-dimethyl-2-propenamide and 4-ethenyl-4'-methyl-2,2'-bipyridine (9CI) (CA INDEX NAME)

CM 1

CRN 387820-81-7

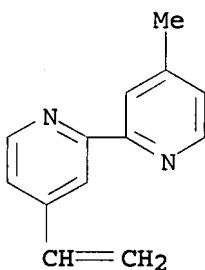
CMF C41 H72 O14 Si8



CM 2

CRN 74173-48-1

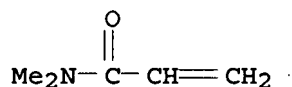
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CM 3

CRN 2680-03-7

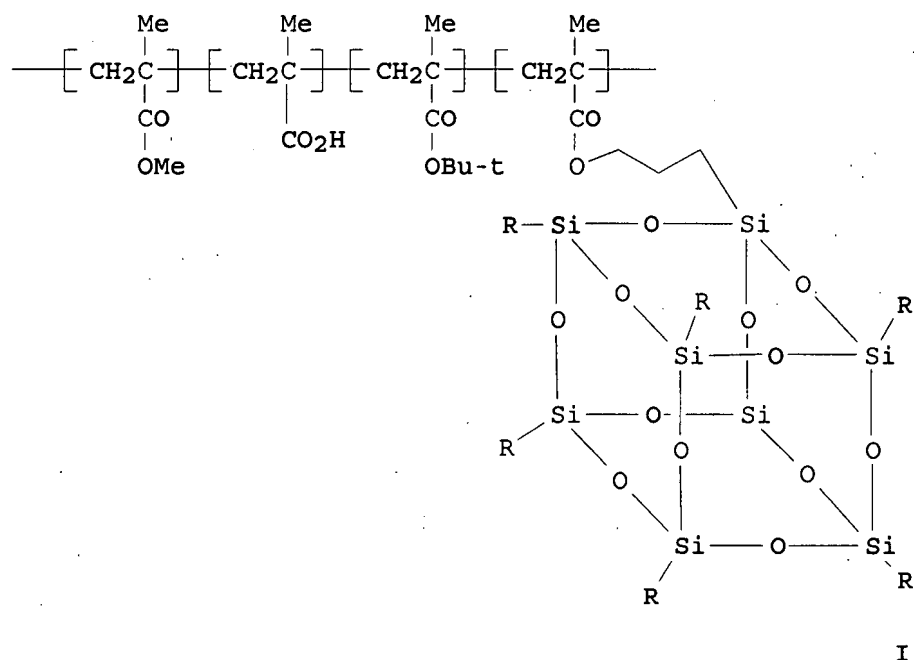
CMF C5 H9 N O



RE.CNT 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 15 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2002:716627 HCAPLUS  
DN 137:270509  
TI High resolution resists comprising nanoparticles and inorganic moieties  
for next generation lithographies  
IN Gonsalves, Kenneth E.  
PA University of North Carolina at Charlotte, USA; University of Connecticut  
SO PCT Int. Appl., 62 pp.  
CODEN: PIXXD2  
DT Patent  
LA English  
FAN.CNT 4

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2002073308	A1	20020919	WO 2002-US7338	20020311
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
AU 2002254170	A1	20020924	AU 2002-254170	20020311
EP 1377876	A1	20040107	EP 2002-723388	20020311
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
JP 2004530921	T	20041007	JP 2002-572502	20020311
PRAI US 2001-274719P	P	20010312		
WO 2002-US7338	W	20020311		
GI				



AB The present invention provides new high resolution resists applicable to next generation lithogs., methods of making these novel resists, and methods of using these new resists in lithog. processes to effect state-of-the-art lithogs. New nanocomposite resists comprising polymers of the general formula I (R = alkyl, cycloalkyl, silyl, aryl, aralkyl, alkenyl) and nanoparticles in a polymer matrix are provided in the invention. New chemical amplified resists that incorporate inorg. moieties as part of the polymer and chemical amplified resists that incorporate photoacid generating groups within the polymeric chain are presented. Novel non-chemical amplified yet photosensitive resists, and new organic-inorg. **hybrid** resists are also provided. This invention and the embodiments described constitute fundamentally new architectures for high resolution resists that achieve high sensitivity, contrast, resolution and high plasma etch resistance.

IC ICM G03C001-725

ICS G03F007-039; G03F007-075; G03F007-26

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 38, 76

ST chem amplified resist nanoparticle silsesquioxane photoacid generator copolymer polymer; lithog electron ion beam x ray chem amplified resist; photolithog UV chem amplified resist nanoparticle silsesquioxane

IT Photolithography

(UV; chemical amplified resists comprising copolymers with sulfonium photoacid generator monomer for)

IT Resists

(chemical amplified resists comprising copolymers with sulfonium photoacid generator monomer)

IT Electron beam lithography

Ion beam lithography

X-ray lithography

(chemical amplified resists comprising copolymers with sulfonium photoacid generator monomer for)

IT Integrated circuits  
(chemical amplified resists comprising copolymers with sulfonium photoacid generator monomer for fabrication of)

IT Polyoxymethylenes, preparation  
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(chemical amplified resists comprising polyacetals)

IT Silsesquioxanes  
RL: TEM (Technical or engineered material use); USES (Uses)  
(chemical amplified resists comprising polyhydral oligosilsesquioxanes, nanoparticles and inorg. moieties)

IT 43127-35-1, ZEP 520  
RL: TEM (Technical or engineered material use); USES (Uses)  
(ZEP 520; chemical amplified resists comprising polyhydral oligosilsesquioxanes, nanoparticles and inorg. moieties)

IT 352455-55-1P 362675-17-0P 461699-74-1P  
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(chemical amplified resists comprising copolymers with sulfonium photoacid generator monomer)

IT 461699-77-4P 461699-80-9P  
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(chemical amplified resists comprising polyacetals)

IT 359408-40-5P  
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(chemical amplified resists comprising polyhydral oligosilsesquioxanes, nanoparticles and inorg. moieties)

IT 136849-03-1  
RL: TEM (Technical or engineered material use); USES (Uses)  
(chemical amplified resists comprising polyhydral oligosilsesquioxanes, nanoparticles and inorg. moieties)

IT 338731-99-0P  
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(chemical amplified resists comprising sulfonium photoacid generator polymer)

IT 2170-03-8, Itaconic anhydride  
RL: TEM (Technical or engineered material use); USES (Uses)  
(dissoln. promoter; chemical amplified resists comprising copolymers with sulfonium photoacid generator monomer)

IT 352455-54-0P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(in preparation of copolymers containing sulfonium photoacid generator monomer)

IT 108-95-2, Phenol, reactions 920-46-7, Methacryloyl chloride  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(in preparation of sulfonium photoacid generator monomer)

IT 1005-35-2P 301152-82-9P 364325-13-3P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(in preparation of sulfonium photoacid generator monomer)

IT 352455-55-1P 362675-17-0P 461699-74-1P  
RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(chemical amplified resists comprising copolymers with sulfonium photoacid generator monomer)

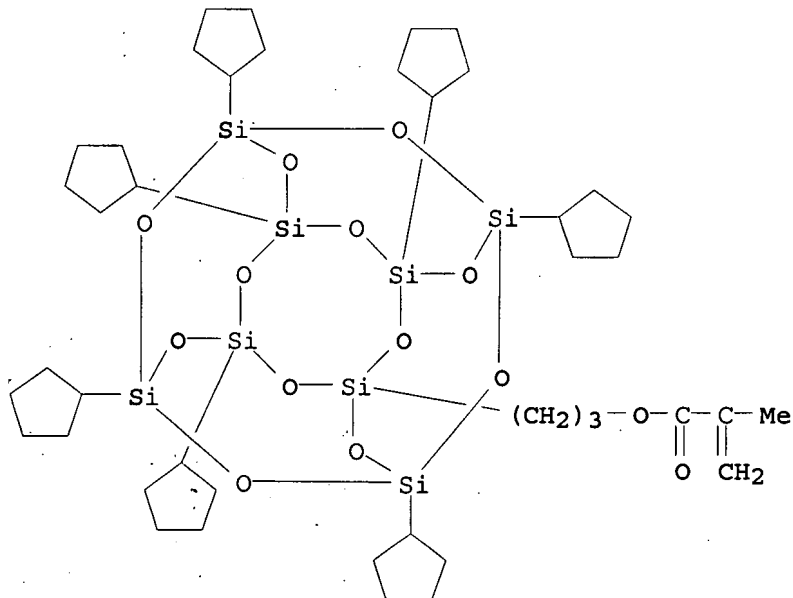
RN 352455-55-1 HCAPLUS

CN Sulfonium, dimethyl[4-[(2-methyl-1-oxo-2-propenyl)oxylphenyl]-, salt with trifluoromethanesulfonic acid (1:1), polymer with 1,1-dimethylethyl 2-methyl-2-propenoate and 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.1.7,13]octasiloxanyl)propyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

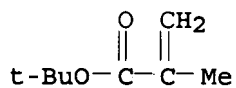
CMF C42 H74 O14 Si8



CM 2

CRN 585-07-9

CMF C8 H14 O2



CM 3

CRN 352455-54-0

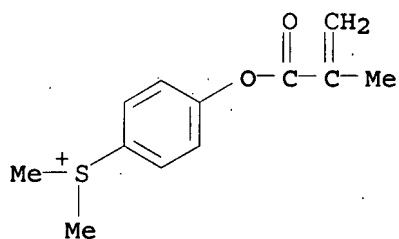
CMF C12 H15 O2 S . C F3 O3 S

CM 4

CRN 141718-72-1

CMF C12 H15 O2 S

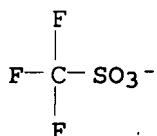




CM 5

CRN 37181-39-8

CMF C F3 O3 S



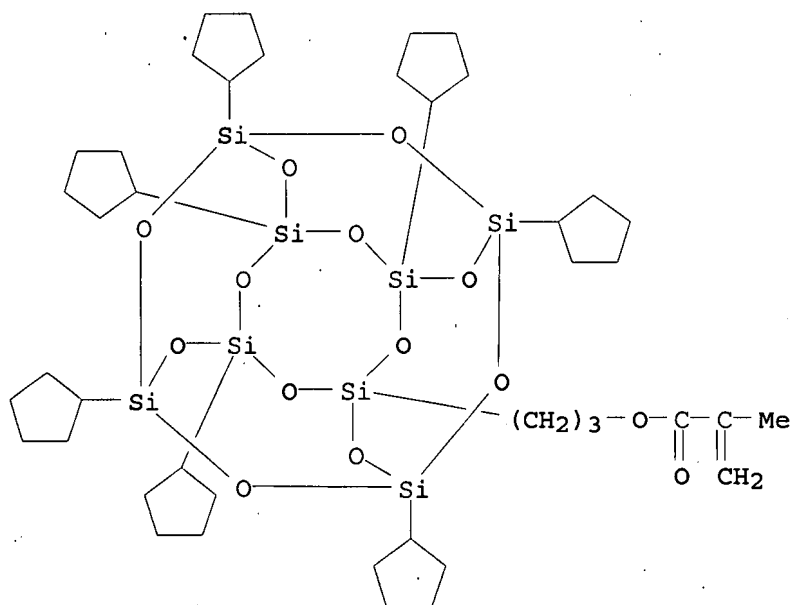
RN 362675-17-0 HCAPLUS

CN Sulfonium, dimethyl[4-[(2-methyl-1-oxo-2-propenyl)oxy]phenyl]-, salt with trifluoromethanesulfonic acid (1:1), polymer with dihydro-3-methylene-2,5-furandione, 1,1-dimethylethyl 2-methyl-2-propenoate, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate and methyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

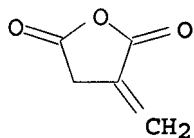
CMF C42 H74 O14 Si8



CM 2

CRN 2170-03-8

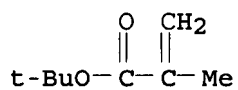
CMF C5 H4 O3



CM 3

CRN 585-07-9

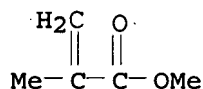
CMF C8 H14 O2



CM 4

CRN 80-62-6

CMF C5 H8 O2



CM 5

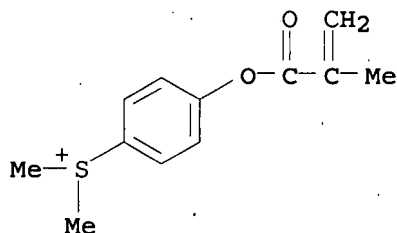
CRN 352455-54-0

CMF C12 H15 O2 S . C F3 O3 S

CM 6

CRN 141718-72-1

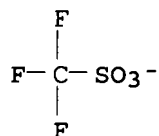
CMF C12 H15 O2 S .



CM 7

CRN 37181-39-8

CMF C F3 O3 S



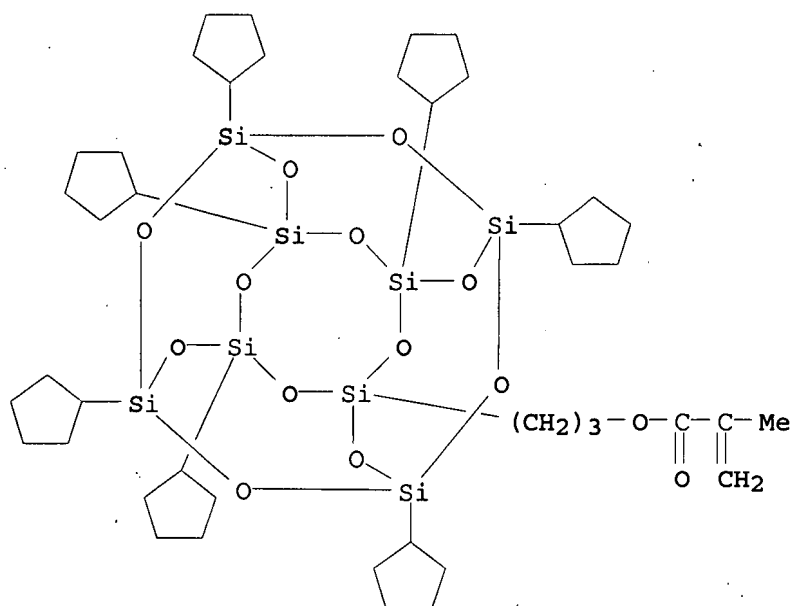
RN 461699-74-1 HCAPLUS

CN Sulfonium, dimethyl[4-[(2-methyl-1-oxo-2-propenyl)oxy]phenyl]-, salt with trifluoromethanesulfonic acid (1:1), polymer with 1,1-dimethylethyl 2-methyl-2-propenoate, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate, methyl 2-methyl-2-propenoate and 2-methyl-2-propenoic acid (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

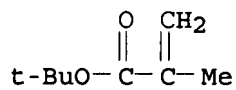
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CM 2

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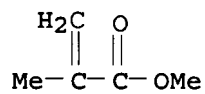
CMF C8 H14 O2



CM 3

CRN 80-62-6

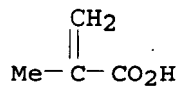
CMF C5 H8 O2



CM 4

CRN 79-41-4

CMF C4 H6 O2



CM 5

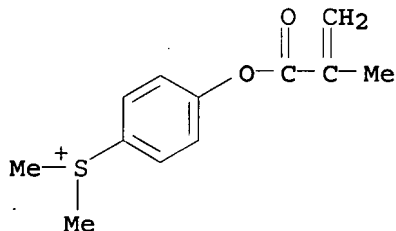
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CMF C12 H15 O2 S . C F3 O3 S

CM 6

CRN 141718-72-1

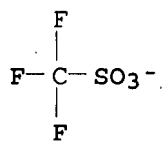
CMF C12 H15 O2 S



CM 7

CRN 37181-39-8

CMF C F3 O3 S



IT 359408-40-5P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(chemical amplified resists comprising polyhydryl oligosilsesquioxanes, nanoparticles and inorg. moieties)

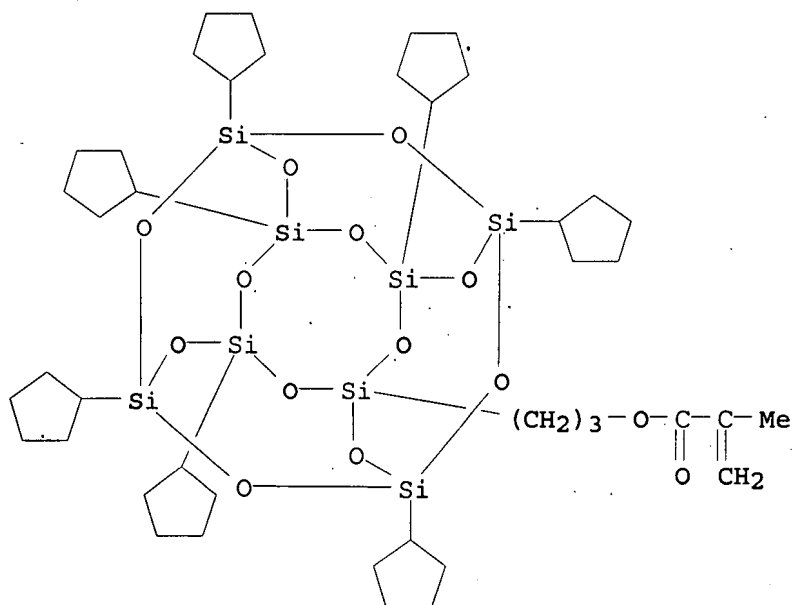
RN 359408-40-5 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, polymer with 1,1-dimethylethyl 2-methyl-2-propenoate, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate and methyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

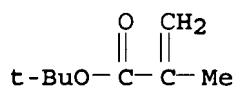
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CM 2

CRN 585-07-9

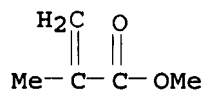
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CM 3

CRN 80-62-6

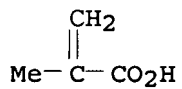
CMF C5 H8 O2



CM 4

CRN 79-41-4

CMF C4 H6 O2



RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 16 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2002:483838 HCAPLUS

DN 137:248272

TI Synthesis and Properties of Perfluoroalkyl Groups Containing Double Four-Ring Spherosilicate (Siloxysilsesquioxane) Precursors

AU Hoebbel, Dagobert; Weber, Christine; Schmidt, Helmut; Krueger, Ralph-Peter

CS Institut fuer Neue Materialien GmbH, Saarbruecken, D-66123, Germany

SO Journal of Sol-Gel Science and Technology (2002), 24(2), 121-129

CODEN: JSGTEC; ISSN: 0928-0707

PB Kluwer Academic Publishers

DT Journal

LA English

AB Organically modified cage-like double four-ring spherosilicates have received considerable interest in the construction of nanosized hybrid materials, as well as building units for structural well-defined polymers. This group is extended by perfluoroalkyl ligands containing spherosilicates, synthesized by addition reaction of the octahydriddimethylsiloxyoctasilsesquioxane  $[H(CH_3)_2Si]_8Si_8O_{20}$  and heptadecafluorodecyl methacrylate. The resultant liquid spherosilicate substituted with eight terminal perfluoroalkyl groups was characterized by  $^{29}Si$  and  $^{13}C$  NMR spectroscopies and MALDI Time-of-Flight mass spectrometry. Partial substitution of perfluoroalkyl ligands by trimethoxysilyl containing groups provides condensable precursors for the synthesis of hydrophobic and oleophobic materials via the sol-gel process. This new spherosilicate, carrying on average four perfluoroalkyl groups and four trimethoxysilyl groups shows better hydrophobic and oleophobic properties compared with commonly used perfluoroalkyltrialkoxysilanes under identical concentration of perfluoroalkyl chains. In addition a comprehensive

literature survey is given on structural well characterized, organically modified cage-like double four-ring spherosilicates.

CC 37-3 (Plastics Manufacture and Processing)

Section cross-reference(s): 57

ST fluorine contg silsesquioxane synthesis sol ceramic coating hydrophobicity

IT Surface tension

(of coatings; synthesis and characterization of perfluoroalkyl group-containing siloxysilsesquioxanes and their sol coatings)

IT Sol-gel processing

(polymerization; synthesis and characterization of perfluoroalkyl

group-containing

siloxysilsesquioxanes and their sol coatings)

IT Silsesquioxanes

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (silicate-, fluorine-containing; synthesis and characterization of perfluoroalkyl group-containing siloxysilsesquioxanes and their sol coatings)

IT Fluoropolymers, preparation

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (silicate-silsesquioxane-, synthesis and characterization of perfluoroalkyl group-containing siloxysilsesquioxanes and their sol coatings)

IT Polymerization

(sol-gel; synthesis and characterization of perfluoroalkyl group-containing siloxysilsesquioxanes and their sol coatings)

IT Ceramers

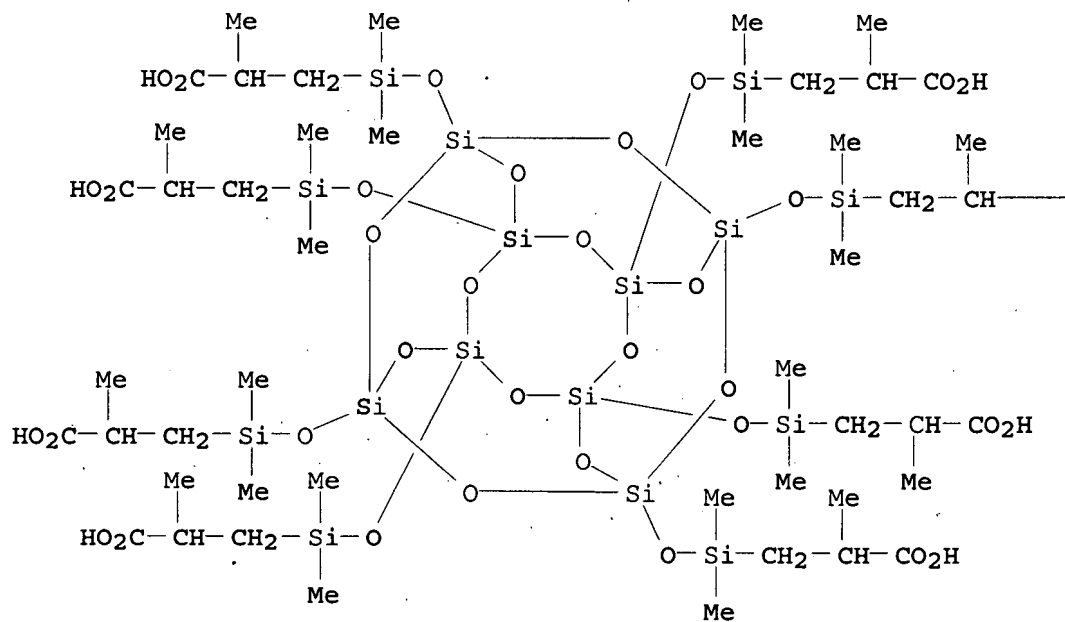
Ceramic coatings

(synthesis and characterization of perfluoroalkyl group-containing





PAGE 1-A



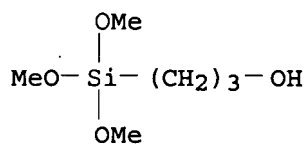
PAGE 1-B

—  $\text{CO}_2\text{H}$

CM 2

CRN 53764-54-8

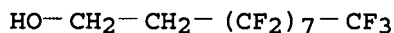
CMF C6 H16 O4 Si



CM 3

CRN 678-39-7

CMF C10 H5 F17 O



IT 460730-47-6P 460730-48-7P

RL: SPN (Synthetic preparation); PREP (Preparation)

(synthesis and characterization of perfluoroalkyl group-containing siloxysilsesquioxanes and their sol coatings)

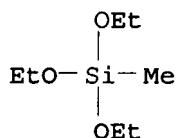
RN 460730-47-6 HCAPLUS

CN Propanoic acid, 3,3',3'',3''',3'''',3''''',3''''',3''''',3''''',3''''',  
[pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-  
octayloctakis[oxy(dimethylsilylene)]]octakis[2-methyl-,  
tetrakis(3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptafluorodecyl)  
tetrakis[3-(trimethoxysilyl)propyl] ester, polymer with silicic acid  
(H4SiO4) tetraethyl ester and triethoxymethylsilane (9CI) (CA INDEX NAME)

CM 1

CRN 2031-67-6

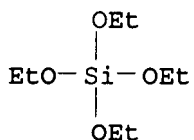
CMF C7 H18 O3 Si



CM 2

CRN 78-10-4

CMF C8 H20 O4 Si



CM 3

CRN 460730-46-5

CMF C112 H172 F68 O48 Si20

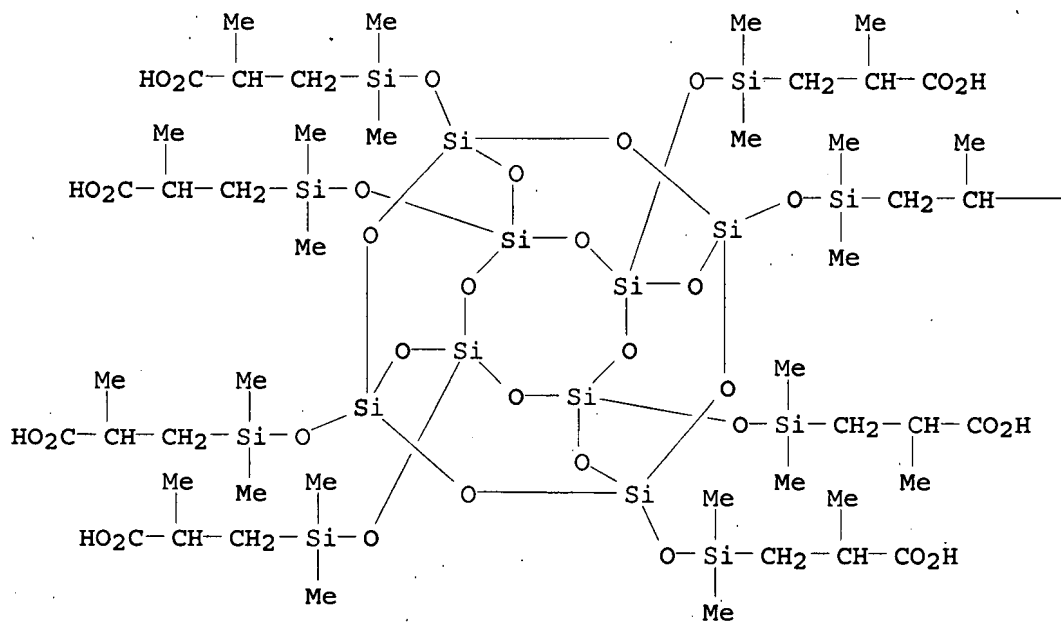
CCI    IDS

CM 4

CRN 460730-45-4

CMF C48 H104 O36 Si16

PAGE 1-A

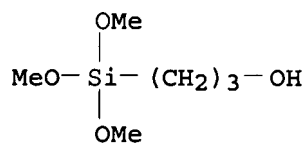


PAGE 1-B

— CO<sub>2</sub>H

CM .5

CRN 53764-54-8  
CMF C6 H16 O4 Si



CM 6

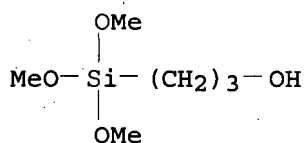
CRN 678-39-7  
CMF C10 H5 F17 O



—CO<sub>2</sub>H

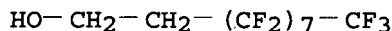
CM 3

CRN 53764-54-8  
CMF C6 H16 O4 Si



CM 4

CRN 678-39-7  
CMF C10 H5 F17 O



RE.CNT 49 THERE ARE 49 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 17 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 2002:232280 HCAPLUS  
DN 136:370435  
TI Thermal properties and morphology of POSS/PMMA hybrids prepared  
by copolymerization and blending  
AU Xiao, Jun; Feher, Frank J.  
CS Dep. Chem., Univ. California, Irvine, CA, 92697-2025, USA  
SO PMSE Preprints (2002), 86, 171-172  
CODEN: PPMRA9; ISSN: 1550-6703  
PB American Chemical Society  
DT Journal; (computer optical disk)  
LA English  
AB **Hybrids** containing polyhedral oligosilsesquioxanes (POSS) have  
attracted considerable attention because the incorporation of POSS into  
traditional organic polymer resins often leads to useful property  
enhancements. Two common methods used to produce POSS-containing  
**hybrids** were copolymn. of functionalized POSS monomers with MMA,  
and blending of POSS with molten thermoplastics. In this paper, we use  
both methods to synthesize and characterize POSS/PMMA **hybrids**  
containing up to 30 weight % POSS. A detailed anal. of the differential  
scanning

calorimetry (DSC) and SEM data indicate that compatibility and miscibility play an important role in determining the phys. characteristics of POSS-containing hybrids.

CC 37-6 (Plastics Manufacture and Processing)  
Section cross-reference(s): 29

ST thermal property morphol polyhedral oligosilsesquioxane PMMA hybrid

IT Polymer morphology  
(fracture-surface; thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

IT Silsesquioxanes  
RL: PRP (Properties)  
(oligosilsesquioxanes; thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

IT Fracture surface morphology  
(polymeric; thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

IT Fusion enthalpy  
Glass transition temperature  
Hybrid organic-inorganic materials  
Miscibility  
(thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

IT 221326-46-1  
RL: PRP (Properties)  
(mixture with PMMA; thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

IT 9011-14-7, PMMA  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(mixture with oligosilsesquioxane; thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

IT 425409-07-0P 425409-08-1P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

IT 425409-07-0P 425409-08-1P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(thermal properties and morphol. of POSS/PMMA hybrids prepared by copolymn. and blending)

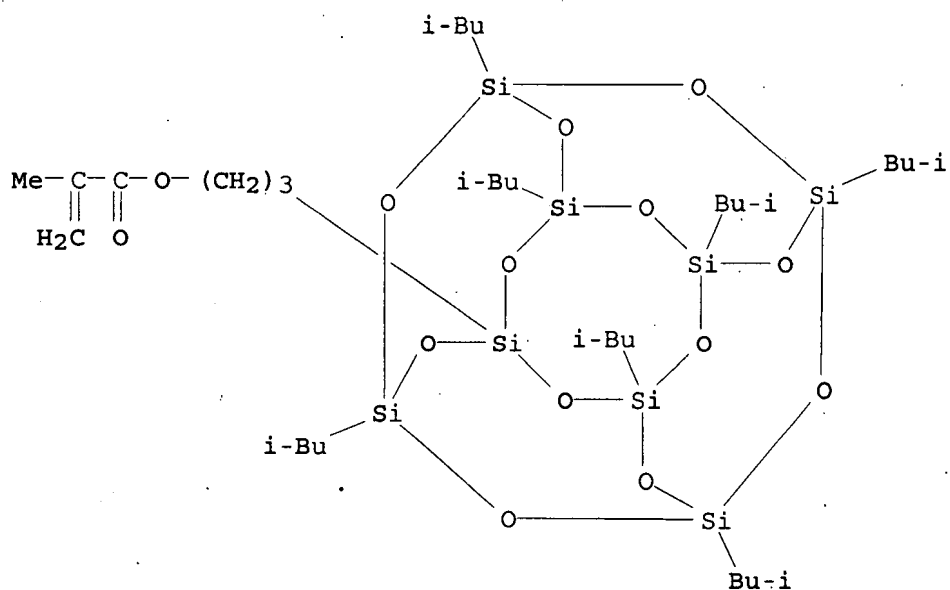
RN 425409-07-0 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[3,5,7,9,11,13,15-heptakis(2-methylpropyl)pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxan-1-yl]propyl ester, polymer with methyl 2-methyl-2-propenoate (CA INDEX NAME)

CM 1

CRN 307531-94-8

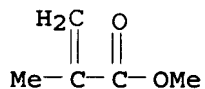
CMF C35 H74 O14 Si8



CM 2

CRN 80-62-6

CMF C5 H8 O2



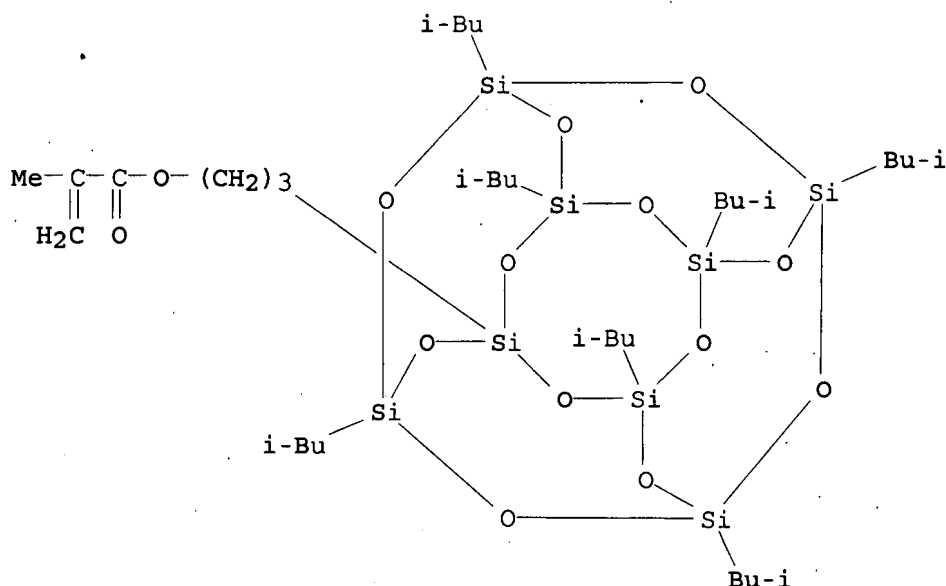
RN 425409-08-1 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-[heptakis(2-methylpropyl)pentacyclo[9.5.1.1.1.3,9.15,15.17,13]octasiloxanyl]propyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 307531-94-8

CMF C35 H74 O14 Si8



RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 18 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:806199 HCAPLUS

DN 136:86132

TI Liquid-crystalline organic-inorganic hybrid polymers with functionalized silsesquioxanes

AU Kim, Kyung-Min; Chujo, Yoshiki

CS Department of Polymer Chemistry, Graduate School of Engineering, Kyoto University, Kyoto, 606-8501, Japan

SO Journal of Polymer Science, Part A: Polymer Chemistry (2001), 39(22), 4035-4043

CODEN: JPACEC; ISSN: 0887-624X

PB John Wiley & Sons, Inc.

DT Journal

LA English

AB Liquid-crystalline (LC) hybrid polymers with functionalized silsesquioxanes with various proportions of LC monomer were synthesized by the reaction of polyhedral oligomeric silsesquioxane (POSS) macromonomer with methacrylate monomer having an LC moiety under common free-radical conditions. The obtained LC hybrid polymers were soluble in common solvents such as THF, toluene, and chloroform, and their structures were characterized with Fourier transform IR,  $^1\text{H}$  NMR, and  $^{29}\text{Si}$  NMR. The thermal stability of the hybrid polymers was increased with an increasing ratio of POSS moieties as the inorg. part. Because of the steric hindrance caused by the bulkiness of the POSS macromonomer, the number-average mol. weight of the hybrid polymers gradually decreased as the molar percentage of POSS in the feed increased. Their liquid crystallinities were very dependent on the POSS segments of the hybrid polymers behaving as hard, compact components. The hybrid polymer with 90 mol% LC moiety (Cube-LC90) showed liquid crystallinity, larger glass-transition temps., and better stability with respect to the LC homopolymer. The results of differential scanning calorimetry and optical polarizing microscopy showed that Cube-LC90 had a smectic-mesophase-like fine-grained texture.



CC 35-4 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 75

ST liq cryst acrylic polymer polyhedral silsesquioxane side group

IT Steric hindrance

(in liquid-crystalline acrylic copolymers with polyhedral silsesquioxane

side

groups)

IT Liquid crystals, polymeric

(liquid-crystalline acrylic copolymers with polyhedral silsesquioxane side groups)

IT Glass transition temperature

Thermal stability

(of liquid-crystalline acrylic copolymers with polyhedral silsesquioxane

side

groups)

IT Silsesquioxanes

RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(polyhedral, oligomeric; liquid-crystalline acrylic copolymers with

polyhedral

silsesquioxane side groups)

IT 14579-03-4, Cyclopentyltrichlorosilane 38595-89-0, (3-

Acryloxypropyl)trichlorosilane

RL: RCT (Reactant); RACT (Reactant or reagent)

(in monomer preparation; liquid-crystalline acrylic copolymers with

polyhedral

silsesquioxane side groups)

IT 183387-28-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(in monomer preparation; liquid-crystalline acrylic copolymers with

polyhedral

silsesquioxane side groups)

IT 117318-92-0P 387820-82-8P 387820-83-9P

RL: PRP (Properties); SPN (Synthetic preparation); PREP

(Preparation)

(liquid-crystalline acrylic copolymers with polyhedral silsesquioxane side groups)

IT 117318-91-9P 387820-81-7P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP

(Preparation); RACT (Reactant or reagent)

(monomer; liquid-crystalline acrylic copolymers with polyhedral

silsesquioxane

side groups)

IT 387820-82-8P 387820-83-9P

RL: PRP (Properties); SPN (Synthetic preparation); PREP

(Preparation)

(liquid-crystalline acrylic copolymers with polyhedral silsesquioxane side groups)

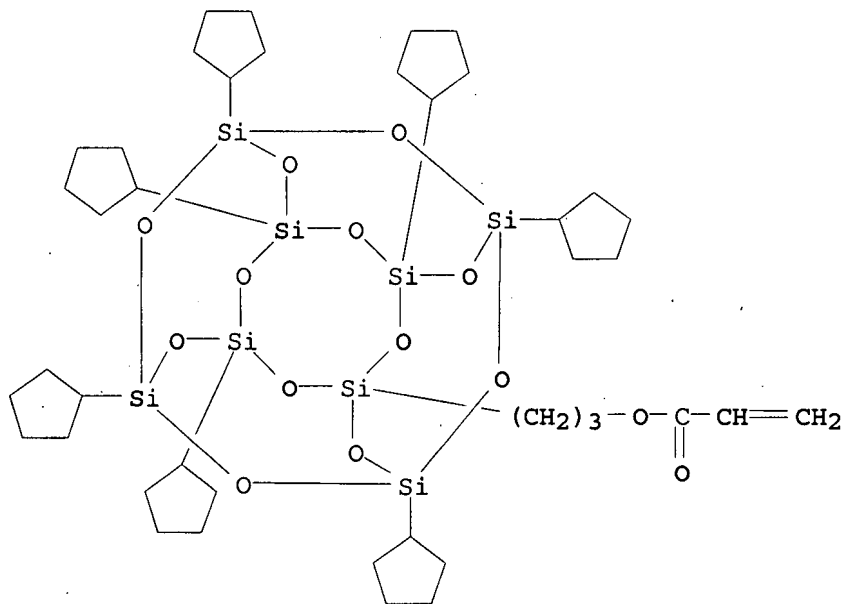
RN 387820-82-8 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 6-[(4'-cyano[1,1'-biphenyl]-4-yl)oxy]hexyl ester, polymer with 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl 2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 387820-81-7

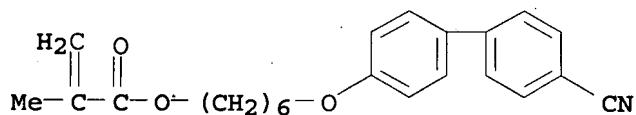
CMF C41 H72 O14 Si8



CM 2

CRN 117318-91-9

CMF C23 H25 N O3



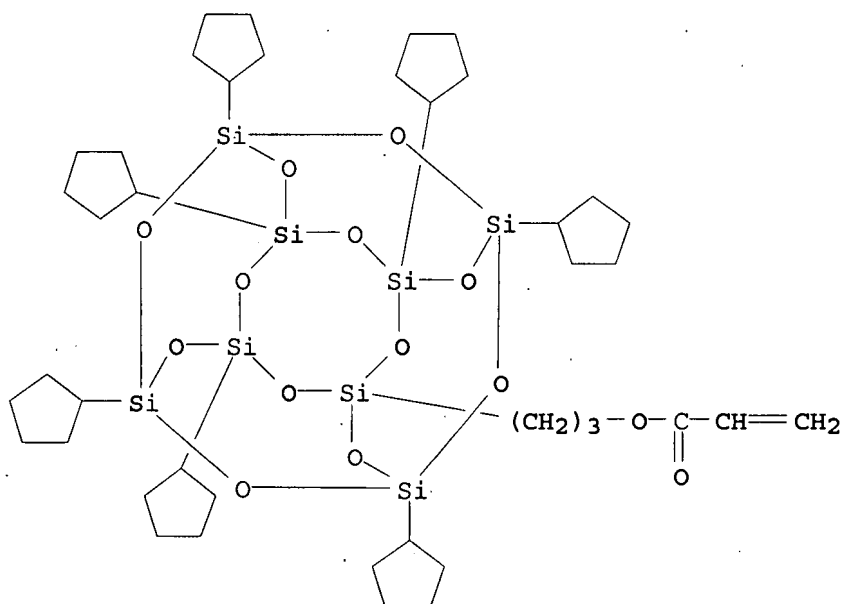
RN 387820-83-9 HCAPLUS

CN 2-Propenoic acid, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 387820-81-7

CMF C41 H72 O14 Si8



IT 387820-81-7P

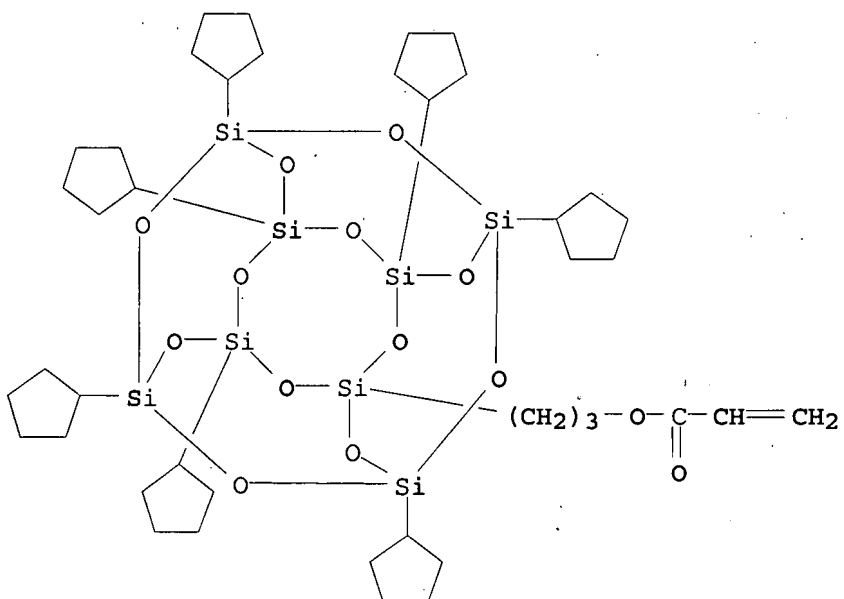
RL: RCT (Reactant); SPN (Synthetic preparation); PREP

(Preparation); RACT (Reactant or reagent)

(monomer; liquid-crystalline acrylic copolymers with polyhedral silsesquioxane side groups)

RN 387820-81-7 HCAPLUS

CN 2-Propenoic acid, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)



RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

KATHLEEN FULLER EIC1700 571/272-2505

L37 ANSWER 19 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2001:503820 HCAPLUS

DN 136:74531

TI Evaluation of neat resins based on methacrylates modified with methacryl-POSS, as potential organic-inorganic **hybrids** for formulating dental restoratives

AU Gao, Feng; Tong, Yuhua; Schricker, Scott R.; Culbertson, Bill M.

CS College of Dentistry, The Ohio State University, Columbus, OH, 43218-2357, USA

SO Polymers for Advanced Technologies (2001), 12(6), 355-360

CODEN: PADTES; ISSN: 1042-7147

PB John Wiley & Sons Ltd.

DT Journal

LA English

AB Three series of neat resins, based on methacrylates or dimethacrylates modified with 1-[3-(methacryl)propyl]-3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane (Methacryl-POSS or POSS-MA), were evaluated. Incorporation of POSS-MA into the polymeric matrix was accomplished in three ways: (a) resins series I was formulated with one-pot copolymn. of a bis-GMA/diluent monomer with POSS-MA; (b) the copolymer of 2-hydroxyethyl methacrylate (HEMA) and POSS-MA, with a weight ratio of 1:1, was first made, then the copolymer hydroxyl groups were converted into methacrylate groups to get a macromer; finally the macromer was copolymd. with bis-GMA/diluents to formulate the second series of neat resins; (c) copolymer of POSS-MA and t-Bu methacrylate (t-BMA) or 2-ethylhexyl methacrylate (EHMA) were first made, then they were combined with a mixture of bis-GMA and the corresponding diluent to make the third kind of neat resins. The amount of POSS incorporated into the neat resin matrix was controlled at 5, 10 and 15 wt%. Incorporating only 5 wt% substantially reduced the shrinkage of the prepared neat resins. The percentage of methacrylate-functionalized POSS monomer in the bis-GMA/diluent base, was compared to neat resins prepared without the POSS. The mech. properties of neat resin having POSS were improved for approaches (b) and (c), but remained at the same level as the neat resins without POSS for approach (a). The results show that miscibility between the POSS component and the matrix, especially the diluent, plays a very important role in the improvement of the properties of the formulated thermosets.

CC 63-7 (Pharmaceuticals)

Section cross-reference(s): 35, 36

ST dental resin methacrylate siloxane

IT Compressive strength

Contraction (mechanical)

(evaluation of neat dental resins based on methacrylates modified with 1-[3-(methacryl)propyl]-3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane as potential organic-inorg. **hybrids**)

IT Polysiloxanes, biological studies

RL: PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)

(methacrylate-; evaluation of neat dental resins based on methacrylates modified with 1-[3-(methacryl)propyl]-3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane as potential organic-inorg. **hybrids**)

IT Dental materials and appliances

(resins; evaluation of neat dental resins based on methacrylates modified with 1-[3-(methacryl)propyl]-3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane as potential organic-inorg. **hybrids**)

IT 279687-80-8P 279687-83-1P 279687-85-3P  
384339-56-4P 384340-21-0P

RL: PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use);  
BIOL (Biological study); PREP (Preparation); USES (Uses)  
(evaluation of neat dental resins based on methacrylates modified with  
1-[3-(methacryl)propyl]-3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5  
.1.13,9.15,15.17,13]octasiloxane as potential organic-inorg.  
hybrids)

IT 279687-80-8P 279687-83-1P 279687-85-3P  
384339-56-4P 384340-21-0P

RL: PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use);  
BIOL (Biological study); PREP (Preparation); USES (Uses)  
(evaluation of neat dental resins based on methacrylates modified with  
1-[3-(methacryl)propyl]-3,5,7,9,11,13,15-heptacyclopentylpentacyclo[9.5  
.1.13,9.15,15.17,13]octasiloxane as potential organic-inorg.  
hybrids)

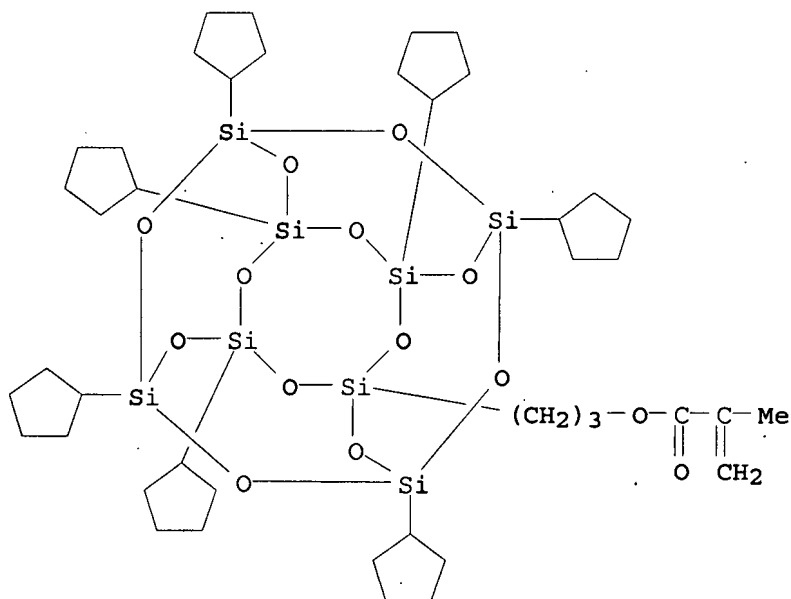
RN 279687-80-8 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 1,6-hexanediyl ester, polymer with  
3-(heptacyclopentylpentacyclo[9.5.1.13,?.15,15.17,13]octasiloxanyl)propyl  
2-methyl-2-propenoate and (1-methylethylidene)bis[4,1-phenyleneoxy(2-  
hydroxy-3,1-propanediyl)] bis(2-methyl-2-propenoate) (9CI) (CA INDEX  
NAME)

CM 1

CRN 169391-91-7

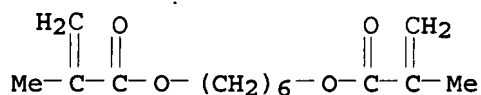
CMF C42 H74 O14 Si8



CM 2

CRN 6606-59-3

CMF C14 H22 O4

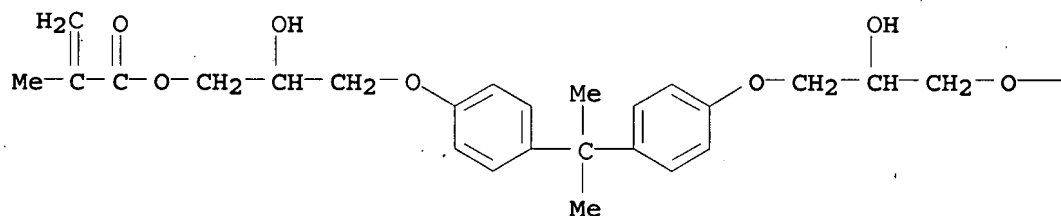


CM 3

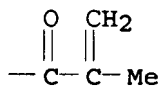
CRN 1565-94-2

CMF C29 H36 O8

PAGE 1-A



PAGE 1-B



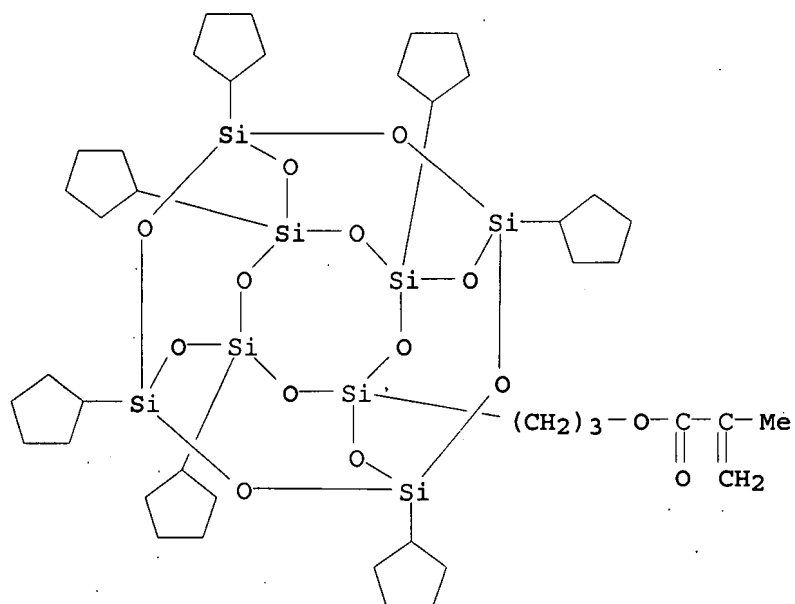
RN 279687-83-1 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis[4,1-phenyleneoxy(2-hydroxy-3,1-propanediyl)] ester, polymer with 1,1-dimethylethyl 2-methyl-2-propenoate and 3-(heptacyclopentylpentacyclo[9.5.1.13,?.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

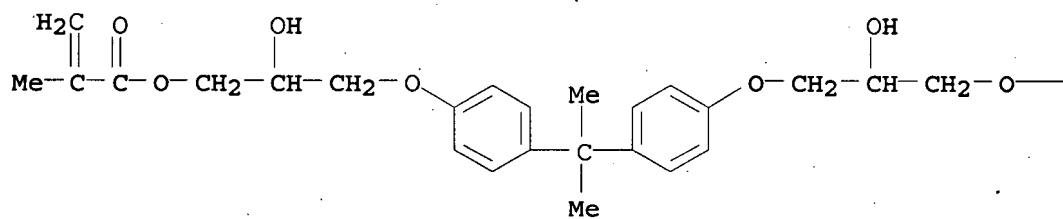
CMF C42 H74 O14 Si8



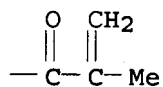
CM 2

CRN 1565-94-2  
CMF C29 H36 O8

PAGE 1-A

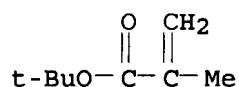


PAGE 1-B



CM 3

CRN 585-07-9  
CMF C8 H14 O2



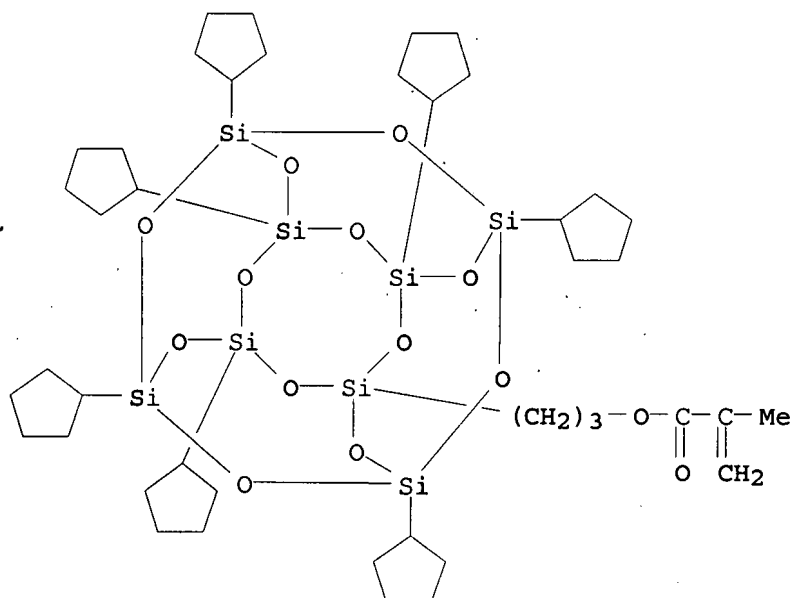
RN 279687-85-3 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis[4,1-phenyleneoxy(2-hydroxy-3,1-propanediyl)] ester, polymer with 2-ethylhexyl 2-methyl-2-propenoate and 3-(heptacyclopentylpentacyclo[9.5.1.13,?.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

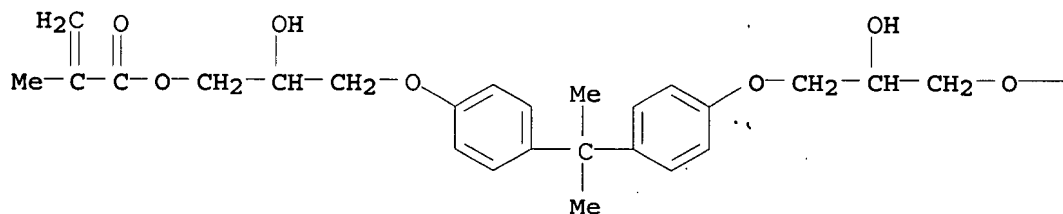
CMF C42 H74 O14 Si8



CM 2

CRN 1565-94-2

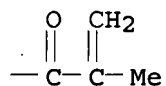
CMF C29 H36 O8



PAGE 1-A



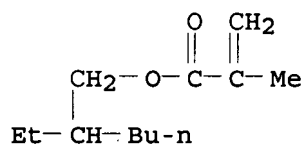
PAGE 1-B



CM 3

CRN 688-84-6

CMF C12 H22 O2



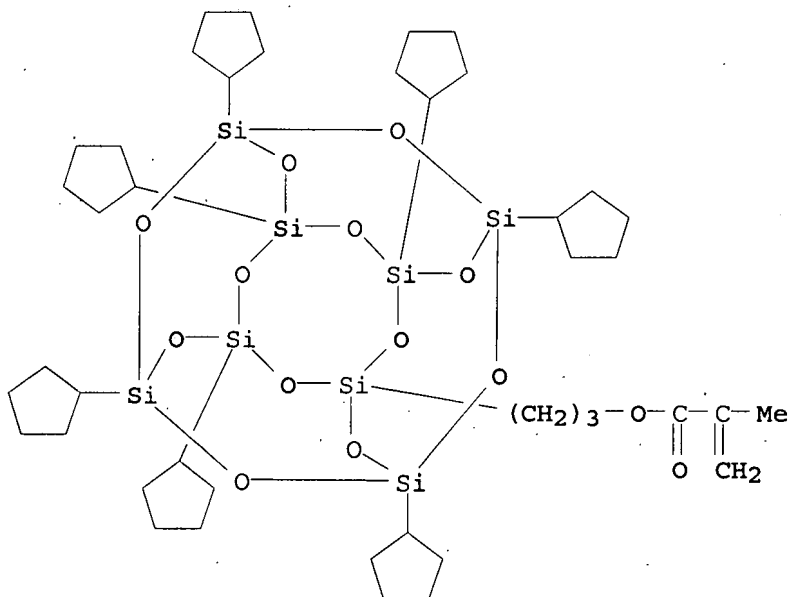
RN 384339-56-4 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 1,6-hexanediyl ester, polymer with 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate and  $\alpha, \alpha'$ -[(1-methylethylidene)di-4,1-phenylene]bis[ $\omega$ -[(2-methyl-1-oxo-2-propenyl)oxy]poly(oxy-1,2-ethanediyl)] (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

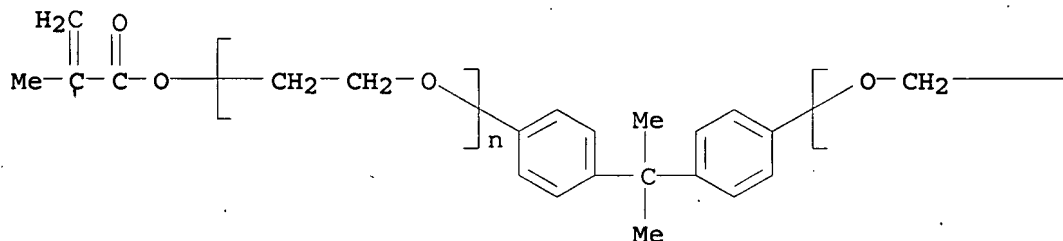
CMF C42 H74 O14 Si8



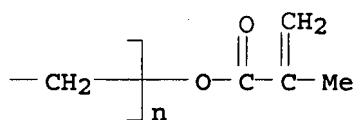
CM 2

CRN 41637-38-1  
 CMF (C2 H4 O)n (C2 H4 O)n C23 H24 O4  
 CCI PMS

PAGE 1-A

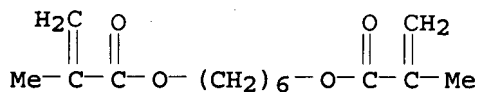


PAGE 1-B



CM 3

CRN 6606-59-3  
 CMF C14 H22 O4

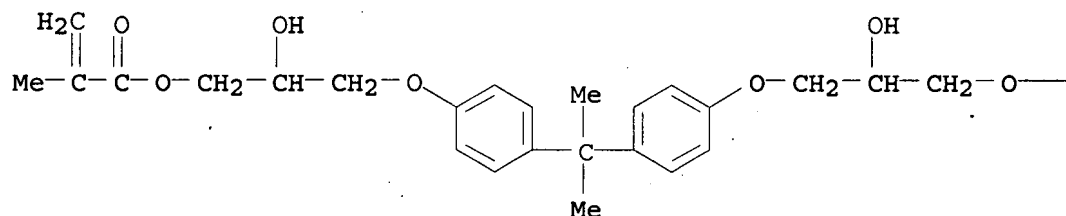


RN 384340-21-0 HCAPLUS  
 CN 2-Propenoic acid, 2-methyl-, 1,2-ethanediylbis(oxy-2,1-ethanediyl) ester, polymer with 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate polymer with 2-hydroxyethyl 2-methyl-2-propenoate 2-methyl-2-propenoate, and (1-methylethylidene)bis[4,1-phenyleneoxy(2-hydroxy-3,1-propanediyl)] bis(2-methyl-2-propenoate) (9CI) (CA INDEX NAME)

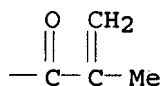
CM 1

CRN 1565-94-2  
 CMF C29 H36 O8

PAGE 1-A

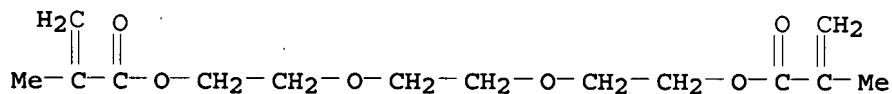


PAGE 1-B



CM 2

CRN 109-16-0  
CMF C14 H22 O6

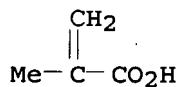


CM 3

CRN 384340-20-9  
CMF (C42 H74 O14 Si8 . C6 H10 O3)x . x C4 H6 O2

CM 4

CRN 79-41-4  
CMF C4 H6 O2

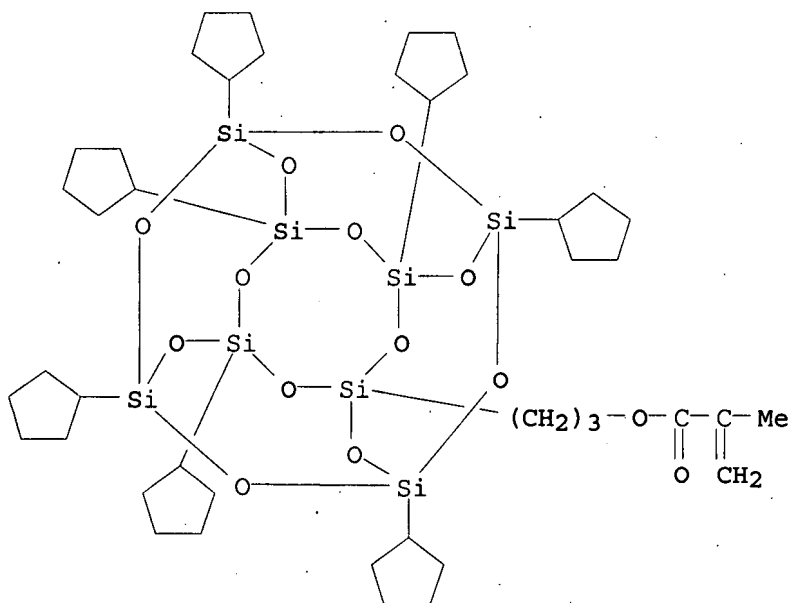


CM 5

CRN 384340-19-6  
CMF (C42 H74 O14 Si8 . C6 H10 O3)x  
CCI PMS

CM 6

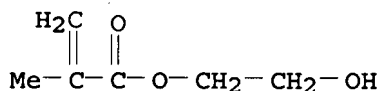
CRN 169391-91-7  
CMF C42 H74 O14 Si8



CM 7

CRN 868-77-9

CMF C6 H10 O3



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 20 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:428857 HCAPLUS

DN 133:177504

TI Hydrosilylation of Allyl Alcohol with [HSiMe2OSiO1.5]8:  
Octa(3-hydroxypropyldimethylsiloxy)octasilsesquioxane and Its  
Octamethacrylate Derivative as Potential Precursors to Hybrid  
Nanocomposites

AU Zhang, Chunxin; Laine, Richard M.

CS Departments of Chemistry and Materials Science and Engineering and the  
Macromolecular Science and Engineering Center, University of Michigan, Ann  
Arbor, MI, 48109-2136, USA

SO Journal of the American Chemical Society (2000), 122(29), 6979-6988  
CODEN: JACSAT; ISSN: 0002-7863

PB American Chemical Society

DT Journal

LA English

AB Octakis(3-hydroxypropyldimethylsiloxy)octasilsesquioxane (OHPS) was  
synthesized by direct hydrosilylation of allyl alc. with  
octakis(dimethylsiloxy)octasilsesquioxane, (HSiMe2O)Si8O12 (Q8M8H), using  
platinum divinyltetramethyldisiloxane [Pt(dvs)] as catalyst.

KATHLEEN FULLER EIC1700 571/272-2505

Surprisingly, C-hydrosilylation occurs in preference to O-silylation. Hydrosilylation of trimethylsiloxy-2-propene with Q8M8H, followed by desilylation also gives pure OHPS. The OHPS reacts with methacryloyl chloride to give octakis(3-methacryloxypropyl-dimethylsiloxy)octasilsesquioxane (OMPS), a thermal and UV/vis curable precursor to organic/inorg. nanocomposites. Direct hydrosilylation of Q8M8H with 2-allyloxyethanol also proceeds primarily via C- rather than O-silylation. In contrast, compds. such as 1,3,5,7-tetramethylcyclotetrasiloxane (D4H), 1,1,3,3-tetramethyldisiloxane (TMDS) or terminal Si-H functionalized poly(dimethylsiloxane) (PDMS-H, MW = 400), give significant amts. of O-silylation along with C-silylation. Initial catalyst concentration studies suggest that the catalytic cycle requires the intermediacy of Pt cluster complexes in contrast to recent studies on the mechanism of hydrosilylation which suggest monometallic complex catalysis.

CC 35-2 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 37, 57

ST allyl alc hydrosilylation methylsiloxysilsesquioxane hydroxypropyldimethylsiloxy silsesquioxane prepn; silsesquioxane prepn platinum vinylmethyldisiloxane hydrosilylation catalyst; **hybrid** nanocomposite precursor silsesquioxane prepn hydrosilylation

IT Silylation  
(C-hydrosilylation, O-silylation, C-silylation; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to **hybrid** nanocomposites)

IT Addition reaction kinetics  
Addition reaction kinetics  
(hydrosilylation kinetics; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to

**hybrid** nanocomposites)

IT **Hybrid** organic-inorganic materials

Hydrosilylation catalysts

Solvent effect

(hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to **hybrid** nanocomposites)

IT Silsesquioxanes

RL: SPN (Synthetic preparation); PREP (Preparation)

(hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to **hybrid** nanocomposites)

IT Polysiloxanes, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(hydrosilylation reactant; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to

**hybrid** nanocomposites)

IT Hydrosilylation

Hydrosilylation

(kinetics; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to **hybrid** nanocomposites)

IT 16941-12-1, Hexachloroplatinic acid 81032-58-8

RL: CAT (Catalyst use); USES (Uses)

(hydrosilylation catalyst; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to

**hybrid** nanocomposites)

IT 7440-06-4DP, Platinum, cyclopentadiene complexes, preparation

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(hydrosilylation catalyst; hydrosilylation of allyl alc. with

octasilsesquioxane and preparation of octamethacrylate derivative precursors to

hybrid nanocomposites)

IT 107-18-6, 2-Propen-1-ol, reactions 107-19-7, Propargyl alcohol  
111-45-5, 2-Allyloxyethanol 920-46-7 18146-00-4,  
Allyloxytrimethylsilane 125756-69-6, Octakis(dimethylsiloxyl)octasilsesquioxane

RL: RCT (Reactant); RACT (Reactant or reagent)

(hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to hybrid nanocomposites)

IT 2370-88-9, Tetramethylcyclotetrasiloxane 9016-00-6, Di-Me siloxane, SRU  
30110-74-8, Tetramethyldisiloxane 31900-57-9, Dimethylsilanediol  
homopolymer

RL: RCT (Reactant); RACT (Reactant or reagent)

(hydrosilylation reactant; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative

precursors to

hybrid nanocomposites)

IT 75-09-2, Dichloromethane, uses 108-88-3, Toluene, uses 109-99-9, uses  
142-82-5, Heptane, uses

RL: NUU (Other use, unclassified); USES (Uses)

(hydrosilylation solvent; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative

precursors to

hybrid nanocomposites)

IT 288290-32-4P, Octakis(3-hydroxypropyldimethylsiloxyl)octasilsesquioxane

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(intermediate and precursor; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative

precursors to

hybrid nanocomposites)

IT 288290-33-5P, Octakis[(3-trimethylsiloxypentyl)dimethylsiloxyl]silsesquioxane

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(intermediate; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to hybrid nanocomposites)

IT 288290-34-6P, Octakis(3-methacryloxypropyldimethylsiloxyl)octasilsesquioxane

RL: SPN (Synthetic preparation); PREP (Preparation)

(precursor; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to hybrid nanocomposites)

IT 288290-34-6P, Octakis(3-methacryloxypropyldimethylsiloxyl)octasilsesquioxane

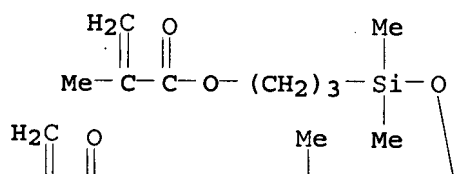
RL: SPN (Synthetic preparation); PREP (Preparation)

(precursor; hydrosilylation of allyl alc. with octasilsesquioxane and preparation of octamethacrylate derivative precursors to hybrid nanocomposites)

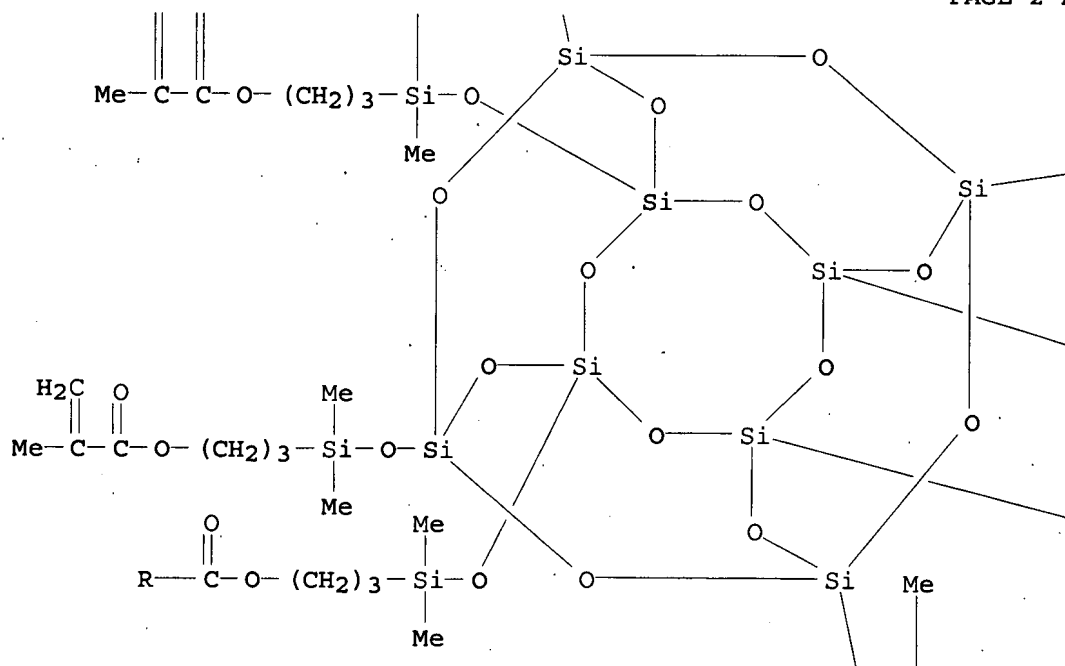
RN 288290-34-6 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-octayloctakis[oxy(dimethylsilylene)-3,1-propanediyl] ester (9CI) (CA INDEX NAME)

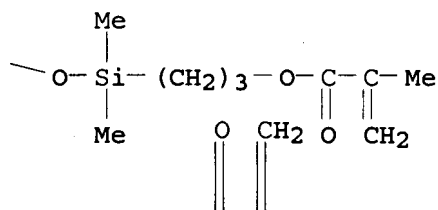
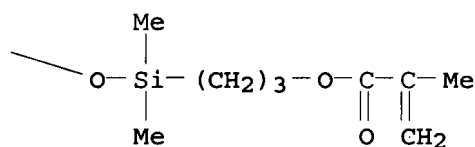
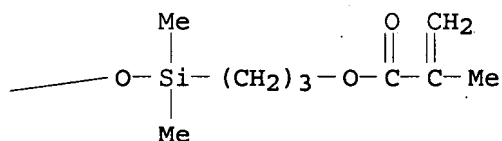
PAGE 1-A



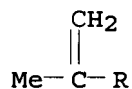
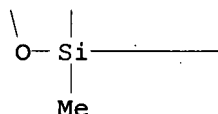
PAGE 2-A



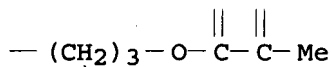
PAGE 2-B



PAGE 3-A



PAGE 3-B



RE.CNT 72 THERE ARE 72 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 21 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:208313 HCAPLUS

DN 132:335664

TI Synthesis and microstructural characterization of POSS-based triblock copolymers prepared using atom transfer radical polymerization

AU Mather, Patrick T.; Chun, Seung B.; Pyun, Jeffrey; Matyjaszewski, Krzysztof; Jeon, Hong G.

KATHLEEN FULLER EIC1700 571/272-2505



CS Polymer Program, Institute of Materials Science, University of  
Connecticut, Storrs, CT, 06269-3136, USA

SO Polymer Preprints (American Chemical Society, Division of Polymer  
Chemistry) (2000), 41(1), 582-583  
CODEN: ACPPAY; ISSN: 0032-3934

PB American Chemical Society, Division of Polymer Chemistry

DT Journal

LA English

AB POSS-based hybrid polymers have provided an approach toward  
enhancing the properties of existing polymer systems with little  
modification to polymerization methods. The present challenge is to extend  
this paradigm to more complex macromol. architectures and compns., namely block  
copolymers. Block copolymers incorporating polyhedral oligomeric  
silsesquioxane (POSS) monomers using atom transfer radical polymerization  
(ATRP) are made and characterized. Triblock copolymers have been synthesized  
starting from polyacrylate macroinitiators (p(Bu acrylate)) and chain  
extending with methacrylate. POSS monomers. Mol. characterization of these  
materials was conducted by SEC and 1H NMR, while microstructural  
characterization was performed using transmission electron microscopy  
(TEM), small angle x-ray scattering (SAXS), and wide-angle x-ray  
scattering (WAXS). The ordered microstructures evolve in terms of the  
interactions between the POSS outer blocks and the acrylate inner block.

CC 39-4 (Synthetic Elastomers and Natural Rubber)

ST methacryloyl silsesquioxane butyl acrylate block copolymer

IT Glass transition temperature  
Hybrid organic-inorganic materials  
(acrylic-silsesquioxane triblock copolymers prepared using atom transfer  
radical polymerization)

IT Acrylic rubber  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(block; acrylic-silsesquioxane triblock copolymers prepared using atom  
transfer radical polymerization)

IT Polymerization  
(block; synthesis and microstructural characterization of POSS-based  
triblock copolymers prepared using atom transfer radical polymerization)

IT Polymerization  
(radical, atom transfer; synthesis and microstructural characterization  
of POSS-based triblock copolymers prepared using)

IT 255872-36-7P 841235-76-5P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(rubber; acrylic-silsesquioxane triblock copolymers prepared using atom  
transfer radical polymerization)

IT 255872-36-7P 841235-76-5P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(rubber; acrylic-silsesquioxane triblock copolymers prepared using atom  
transfer radical polymerization)

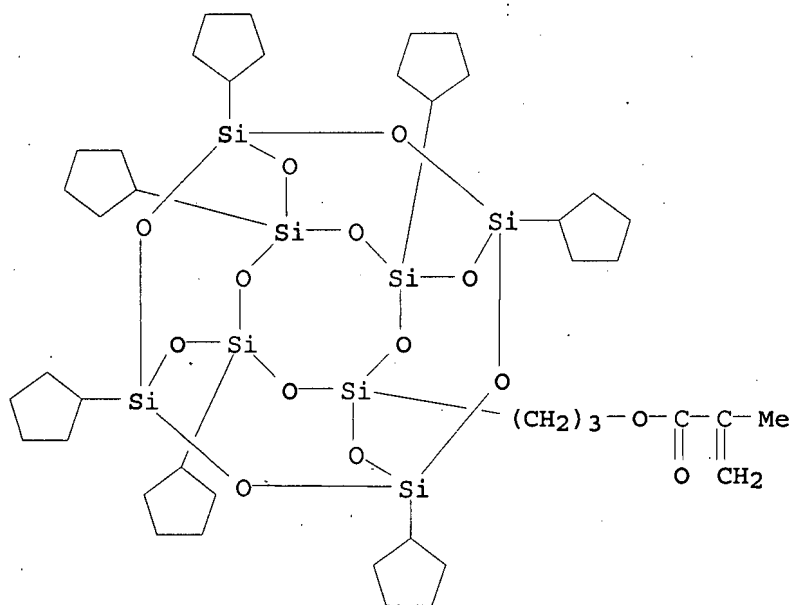
RN 255872-36-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,1  
5.17,13]octasiloxanyl)propyl ester, polymer with butyl 2-propenoate, block  
(9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

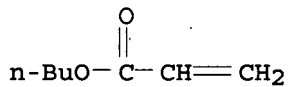
CMF C42 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



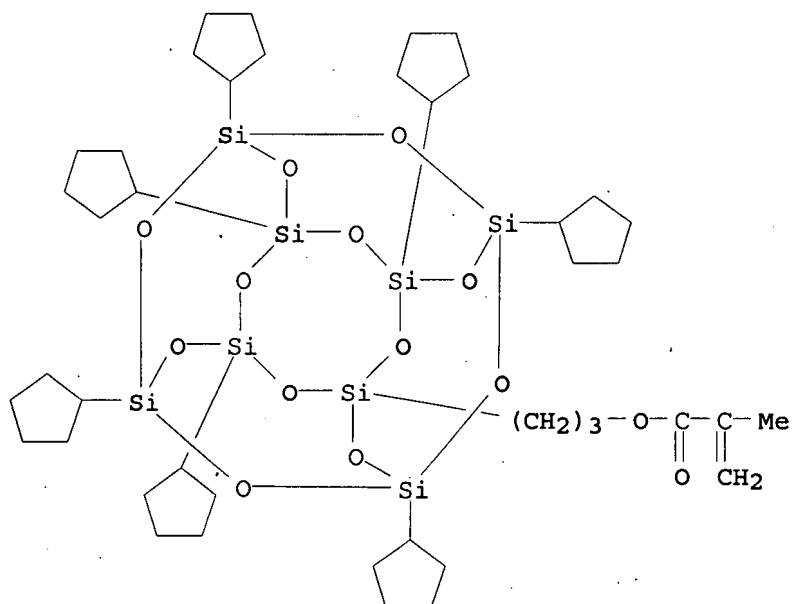
RN 841235-76-5 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyll)propyl ester, polymer with butyl 2-propenoate, triblock (9CI) (CA INDEX NAME).

CM 1

CRN 169391-91-7

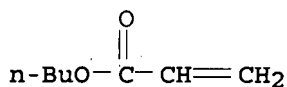
CMF C42 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 22 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 2000:208312 HCAPLUS

DN 133:79275

TI Evaluation of multi-methacrylates copolymerized with methacryl-POSS for potential organic-inorganic hybrid dental restorative materials

AU Gao, Feng; Culbertson, Bill. M.; Tong, Yuhua; Schricker, Scott R.

CS Dentistry College, The Ohio State University, Columbus, OH, 43210-1241, USA

SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2000), 41(1), 580-581

CODEN: ACPPAY; ISSN: 0032-3934

PB American Chemical Society, Division of Polymer Chemistry

DT Journal

LA English

AB The shrinkage of methacrylate-based dental resins prepared can be reduced efficiently by incorporating 5 weight% of methacrylate-functionalized Polyhedral Oligomeric Silsesquioxane (POSS) macromonomer into a mixture of oligomeric dimethacrylate/diluent mixture The mech. properties of the unfilled resins can also be improved.

CC 63-7 (Pharmaceuticals)

ST dental restoration methacrylate polyhedral oligomer silsesquioxane

KATHLEEN FULLER EIC1700 571/272-2505

IT Silsesquioxanes  
 RL: PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use);  
 BIOL (Biological study); PREP (Preparation); USES (Uses)  
 (evaluation of multi-methacrylates copolymd. with methacryl-polyhedral  
 oligomeric silsesquioxane for potential organic-inorg. **hybrid**  
 dental restorative materials)

IT Dental materials and appliances  
 (resins; evaluation of multi-methacrylates copolymd. with  
 methacryl-polyhedral oligomeric silsesquioxane for potential  
 organic-inorg. **hybrid** dental restorative materials)

IT 279687-80-8P 279687-83-1P 279687-85-3P  
 RL: PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use);  
 BIOL (Biological study); **PREP (Preparation)**; USES (Uses)  
 (evaluation of multi-methacrylates copolymd. with methacryl-polyhedral  
 oligomeric silsesquioxane for potential organic-inorg. **hybrid**  
 dental restorative materials)

IT 279687-80-8P 279687-83-1P 279687-85-3P  
 RL: PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use);  
 BIOL (Biological study); **PREP (Preparation)**; USES (Uses)  
 (evaluation of multi-methacrylates copolymd. with methacryl-polyhedral  
 oligomeric silsesquioxane for potential organic-inorg. **hybrid**  
 dental restorative materials)

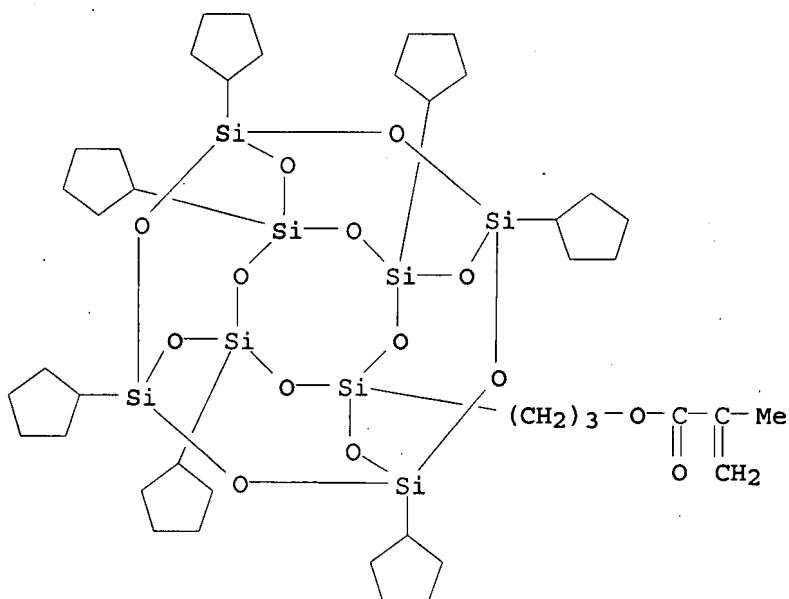
RN 279687-80-8 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 1,6-hexanediyl ester, polymer with  
 3-(heptacyclopentylpentacyclo[9.5.1.13,?.15,15.17,13]octasiloxanyl)propyl  
 2-methyl-2-propenoate and (1-methylethylidene)bis[4,1-phenyleneoxy(2-  
 hydroxy-3,1-propanediyl)] bis(2-methyl-2-propenoate) (9CI) (CA INDEX  
 NAME)

CM 1

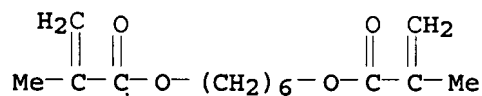
CRN 169391-91-7

CMF C42 H74 O14 Si8



CM 2

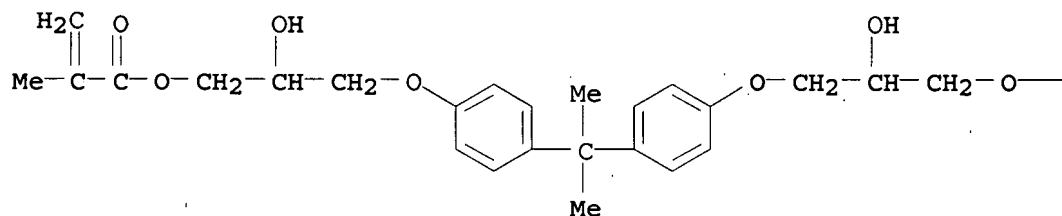
CRN 6606-59-3  
CMF C14 H22 O4



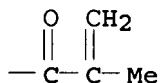
CM 3

CRN 1565-94-2  
CMF C29 H36 O8

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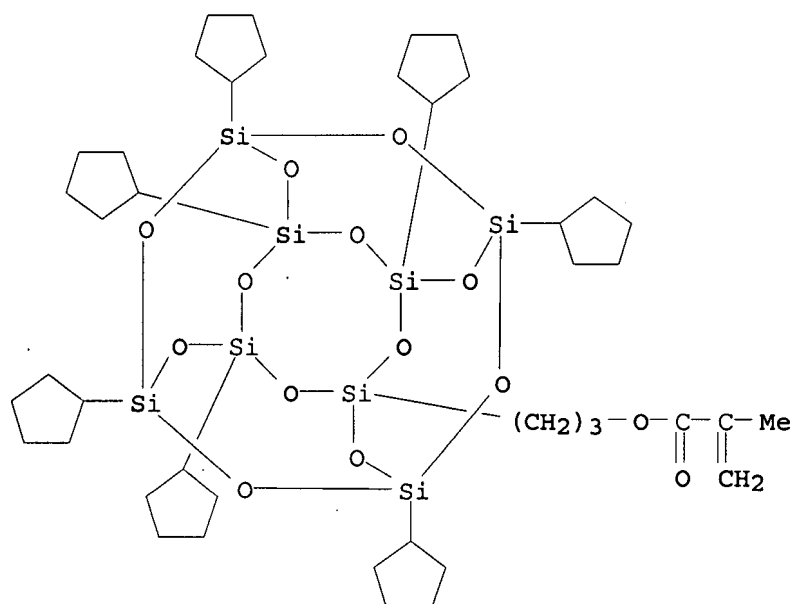
PAGE 1-B



RN 279687-83-1 HCAPLUS  
CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis[4,1-phenyleneoxy(2-hydroxy-3,1-propanediyl)] ester, polymer with 1,1-dimethylethyl 2-methyl-2-propenoate and 3-(heptacyclopentylpentacyclo[9.5.1.13,?.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7  
CMF C42 H74 O14 Si8

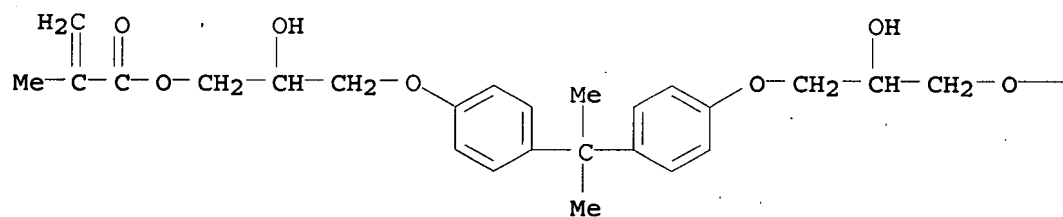


CM 2

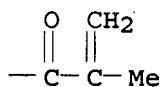
CRN 1565-94-2

CMF C29 H36 O8

PAGE 1-A



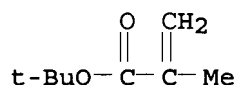
PAGE 1-B



CM 3

CRN 585-07-9

CMF C8 H14 O2



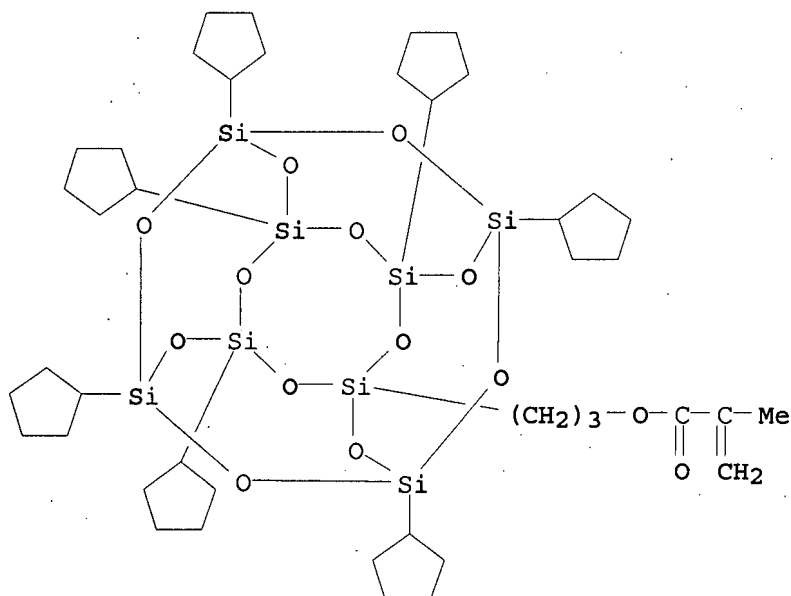
RN 279687-85-3 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, (1-methylethylidene)bis[4,1-phenyleneoxy(2-hydroxy-3,1-propanediyl)] ester, polymer with 2-ethylhexyl 2-methyl-2-propenoate and 3-(heptacyclopentylpentacyclo[9.5.1.13,?.15,15.17,13]octasiloxanyl)propyl 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

CMF C42 H74 O14 Si8

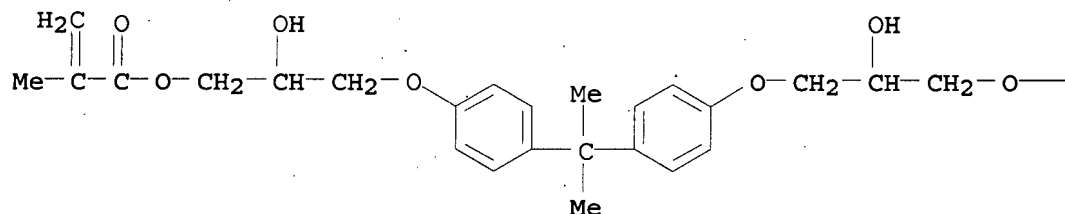


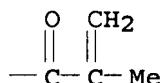
CM 2

CRN 1565-94-2

CMF C29 H36 O8

PAGE 1-A

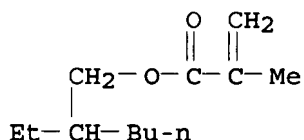




CM 3

CRN 688-84-6

CMF C12 H22 O2



RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 23 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1999:780676 HCAPLUS

DN 132:108370

TI Synthesis of hybrid polymers Using atom transfer radical  
polymerization: Homopolymers and Block Copolymers from polyhedral  
oligomeric silsesquioxane monomers

AU Pyun, Jeffrey; Matyjaszewski, Krzysztof

CS Center for Macromolecular Engineering Department of Chemistry, Carnegie  
Mellon University, Pittsburgh, PA, 15213, USA

SO Macromolecules (2000), 33(1), 217-220

CODEN: MAMOBX; ISSN: 0024-9297

PB American Chemical Society

DT Journal

LA English

AB Homopolymers, triblock copolymers (Bu acrylate comonomer), and star-block  
copolymers (Me acrylate comonomer) of 3-(3,5,7,9,11,13,15-heptacyclopentyl-  
pentacyclo[9.5.1.1.3,91.5,1517,13]octasiloxane-1-yl)propyl methacrylate  
(MA-POSS) have been prepared

CC 35-4 (Chemistry of Synthetic High Polymers)

ST methacrylate functional silsesquioxane atom transfer radical polymn; block  
methacrylate functional silsesquioxane; star block methacrylate functional  
silsesquioxane; butyl acrylate methacrylate functional silsesquioxane  
copolymer; methyl acrylate methacrylate functional silsesquioxane  
copolymer

IT Polymers, preparation

RL: SPN (Synthetic preparation); PREP (Preparation)

(block, siloxanyl star-block; synthesis of hybrid polymers  
using atom transfer radical polymerization of polyhedral oligomeric  
silsesquioxane monomers)

IT Polymerization

(radical, atom-transfer; synthesis of hybrid polymers using  
atom transfer radical polymerization of polyhedral oligomeric silsesquioxane  
monomers)

IT 248603-10-3, 1,1,1-Tris(4-(2-bromoisobutyryloxy)phenyl)ethane

RL: CAT (Catalyst use); USES (Uses)

(initiator; synthesis of hybrid polymers using atom transfer



radical polymerization of polyhedral oligomeric silsesquioxane monomers)

IT 169699-57-4P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (preparation and characterization of; synthesis of **hybrid** polymers  
 using atom transfer radical polymerization of polyhedral oligomeric  
 silsesquioxane monomers)

IT 255872-37-8P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (star-block, 3-arm, preparation and characterization of; synthesis of  
**hybrid** polymers using atom transfer radical polymerization of  
 polyhedral oligomeric silsesquioxane monomers)

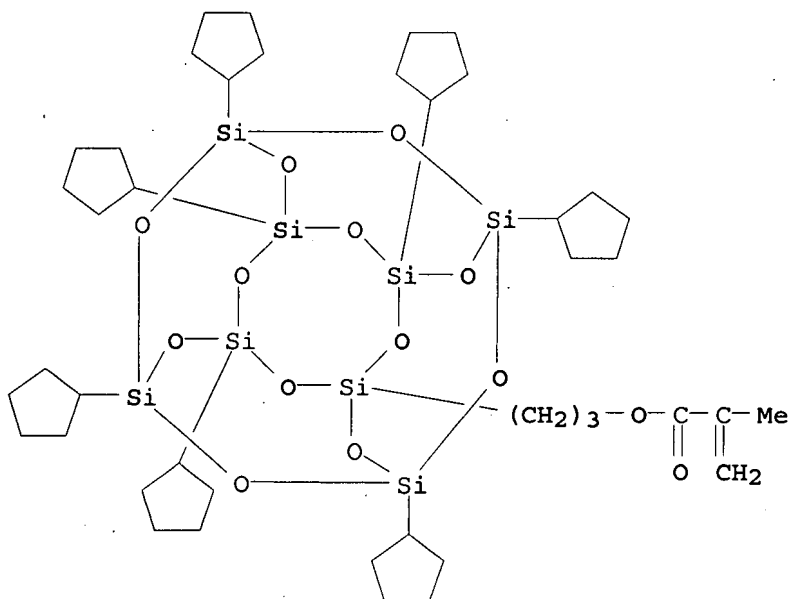
IT 255872-36-7P 841235-76-5P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (triblock, preparation and characterization of; synthesis of **hybrid**  
 polymers using atom transfer radical polymerization of polyhedral oligomeric  
 silsesquioxane monomers)

IT 169699-57-4P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (preparation and characterization of; synthesis of **hybrid** polymers  
 using atom transfer radical polymerization of polyhedral oligomeric  
 silsesquioxane monomers)

RN 169699-57-4 HCAPLUS  
 CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,1  
 5.17,13]octasiloxanyl)propyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7  
 CMF C42 H74 O14 Si8



IT 255872-37-8P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (star-block, 3-arm, preparation and characterization of; synthesis of  
**hybrid** polymers using atom transfer radical polymerization of  
 polyhedral oligomeric silsesquioxane monomers)

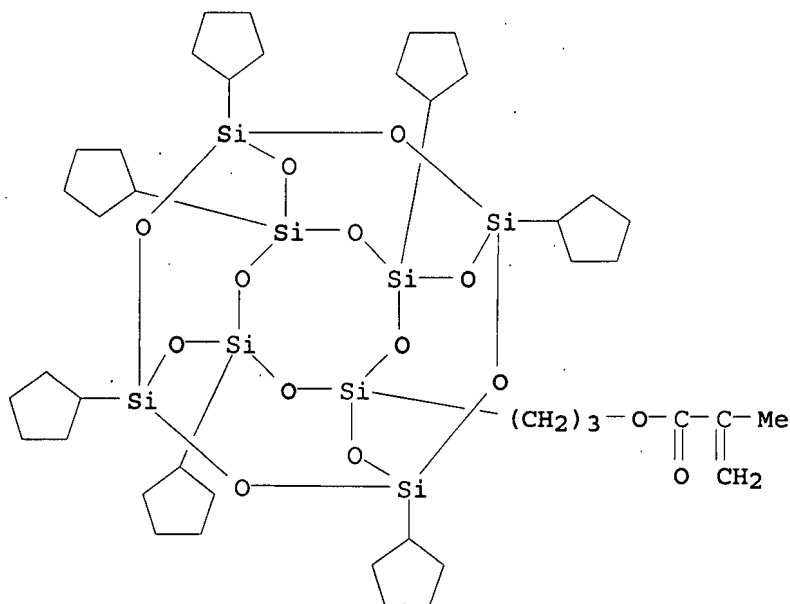
RN 255872-37-8 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with methyl 2-propenoate, block (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

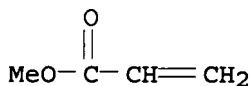
CMF C42 H74 O14 Si8



CM 2

CRN 96-33-3

CMF C4 H6 O2



IT 255872-36-7P 841235-76-5P

RL: SPN (Synthetic preparation); PREP (Preparation)

(triblock, preparation and characterization of; synthesis of hybrid polymers using atom transfer radical polymerization of polyhedral oligomeric silsesquioxane monomers)

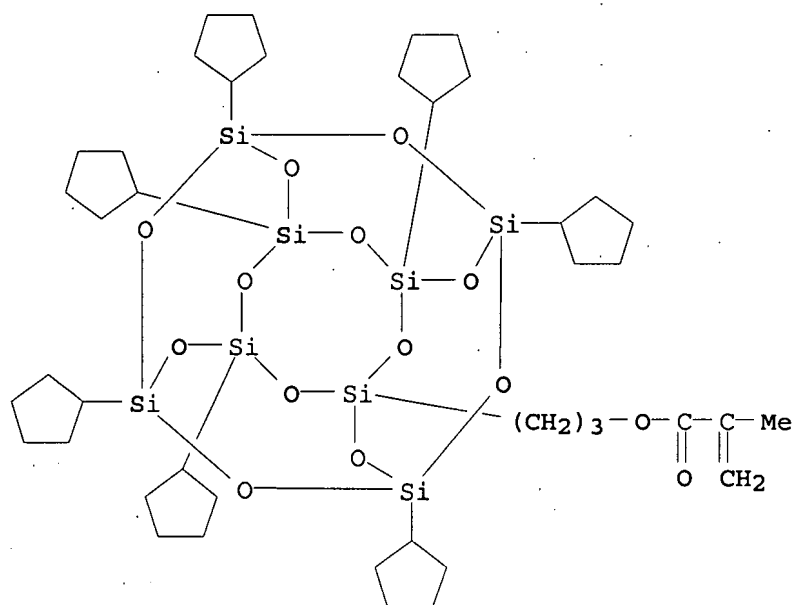
RN 255872-36-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with butyl 2-propenoate, block (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

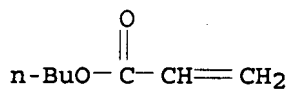
CMF C42 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



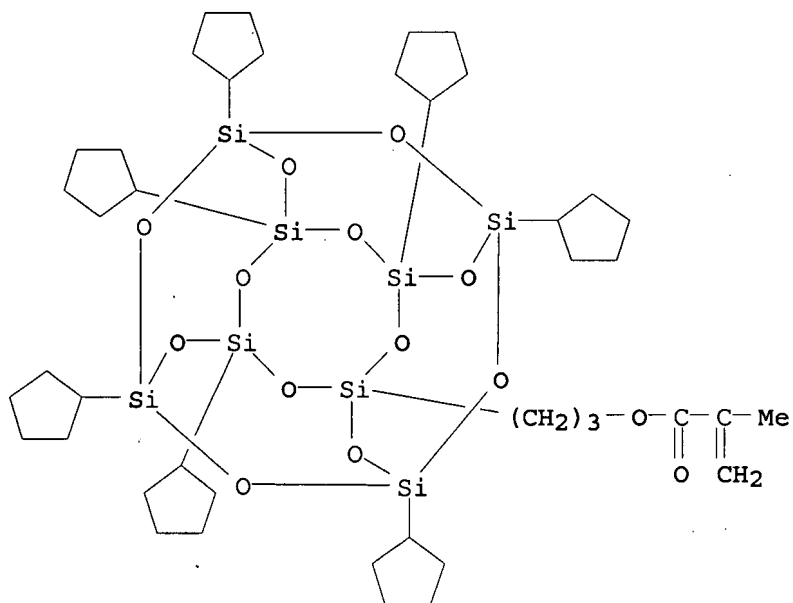
RN 841235-76-5 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyll)propyl ester, polymer with butyl 2-propenoate, triblock (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

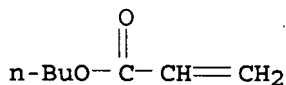
CMF C42 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



RE.CNT 9 ~~THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD~~  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L37 ANSWER 24 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1999:558896 HCAPLUS

DN 132:166622

TI Synthesis of organic/inorganic **hybrid** materials from polysiloxane precursors using atom transfer radical polymerization

AU Pyun, Jeffrey; Miller, Peter J.; Kickelbick, Guido; Matyjaszewski, Krzysztof; Schwab, Joseph; Lichtenhan, Joseph

CS Center for Macromolecular Engineering, Dept. of Chemistry, Carnegie Mellon University, Pittsburgh, PA, 15213, USA

SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (1999), 40(2), 454-455

CODEN: ACPPAY; ISSN: 0032-3934

PB American Chemical Society, Division of Polymer Chemistry

DT Journal

LA English

AB The synthesis of organic/inorg. **hybrid** materials from polyhedral oligomeric silsesquioxanes (POSS) using atom transfer radical polymerization (ATRP) was carried out. From POSS monomers containing either methacryloyl, or styryl groups, well-defined polymers of various compns. and topologies were prepared The composition of these materials was controlled and well-defined

KATHLEEN FULLER EIC1700 571/272-2505

- homopolymers, random and block copolymers of POSS-containing monomers were synthesized. The use of macroinitiators of various topologies allowed for the synthesis of ABA-triblock and star-block copolymers, using ATRP.
- CC 35-4 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 37, 57
- ST silsesquioxane polyhedral oligomer atom transfer radical polymn;  
methacryloyl styryl silsesquioxane ATRP polysiloxane precursor  
**hybrid**; **hybrid** material prepn polyhedral polysiloxane precursor
- IT Silsesquioxanes  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(methacryloyl- and styryl-; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT **Hybrid** organic-inorganic materials  
Molecular topology  
(preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT Polysiloxanes, preparation  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT Polymerization  
(radical, atom transfer; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT Polymers, preparation  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(star-branched; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT 255872-36-7P  
RL: SPN (Synthetic preparation); **PREP (Preparation)**  
(block; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT 600-00-0, Ethyl-2-bromoisobutyrate  
RL: CAT (Catalyst use); USES (Uses)  
(initiator; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT 3030-47-5, PMDETA  
RL: NUU (Other use, unclassified); USES (Uses)  
(preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT 169699-57-4P  
RL: PNU (Preparation, unclassified); **PREP (Preparation)**  
(preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)
- IT 169391-91-7P 183200-99-9P  
RL: SPN (Synthetic preparation); **PREP (Preparation)**  
(preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)

IT 7758-89-6, Cuprous chloride  
 RL: CAT (Catalyst use); USES (Uses)  
 (radical polymerization catalyst; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)

IT 255872-37-8P  
 RL: PNU (Preparation, unclassified); PREP (Preparation)  
 (star block; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)

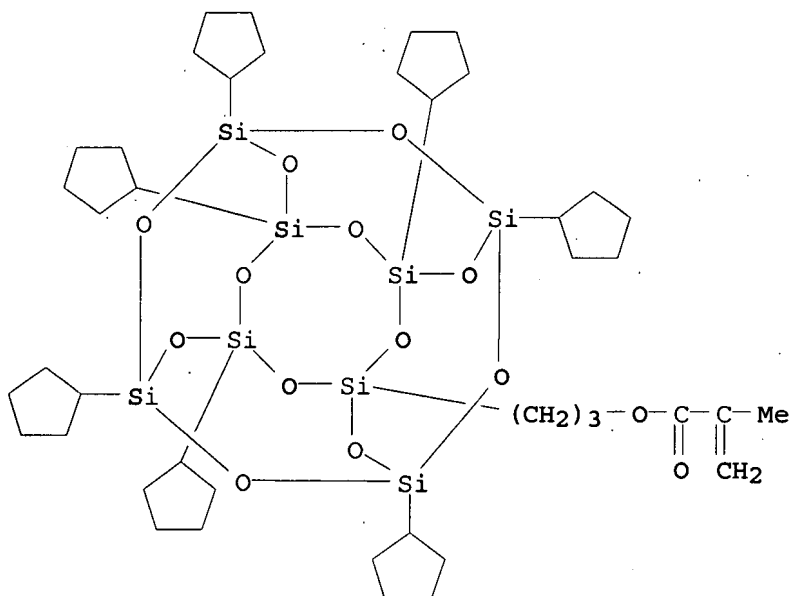
IT 255872-36-7P  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (block; preparation of methacryloyl- and styryl-silsesquioxane homopolymers and block copolymers and star copolymers by ATRP as precursors for organic/inorg. **hybrid** materials)

RN 255872-36-7 HCAPLUS  
 CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, polymer with butyl 2-propenoate, block (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

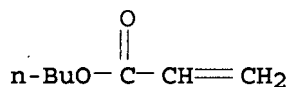
CMF C42 H74 O14 Si8



CM 2

CRN 141-32-2

CMF C7 H12 O2



IT 169699-57-4P

RL: PNU (Preparation, unclassified); PREP (Preparation)  
(preparation of methacryloyl- and styryl-silsesquioxane homopolymers and  
block copolymers and star copolymers by ATRP as precursors for  
organic/inorg. hybrid materials)

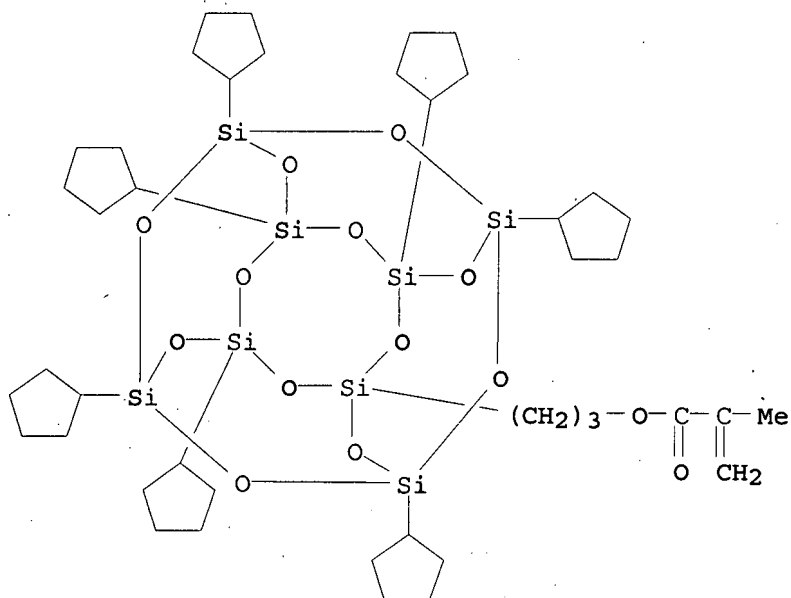
RN 169699-57-4 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,1  
5.17,13]octasiloxanyl)propyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

CMF C42 H74 O14 Si8

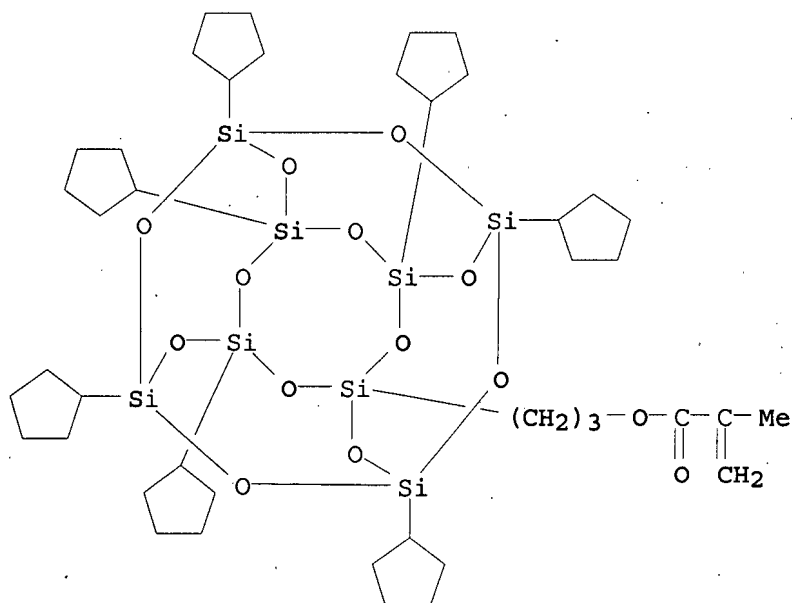


IT 169391-91-7P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(preparation of methacryloyl- and styryl-silsesquioxane homopolymers and  
block copolymers and star copolymers by ATRP as precursors for  
organic/inorg. hybrid materials)

RN 169391-91-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,1  
5.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)



IT 255872-37-8P

RL: PNU (Preparation, unclassified); PREP (Preparation)  
(star block; preparation of methacryloyl- and styryl-silsesquioxane  
homopolymers and block copolymers and star copolymers by ATRP as  
precursors for organic/inorg. **hybrid** materials)

RN 255872-37-8 HCAPLUS

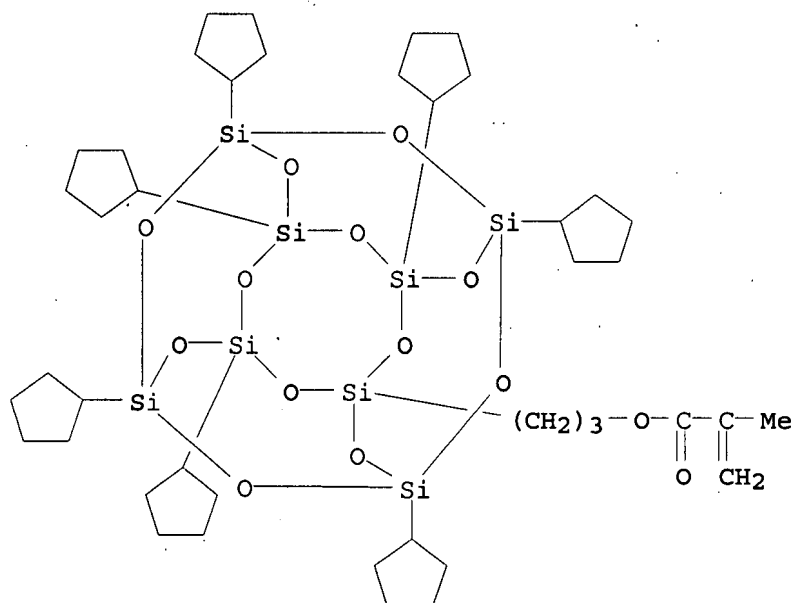
CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,1  
5.17,13]octasiloxanyl)propyl ester, polymer with methyl 2-propenoate,  
block (9CI) (CA INDEX NAME).

CM 1

CRN 169391-91-7

CMF C42 H74 O14 Si8

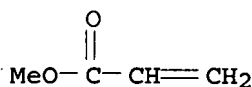




CM 2

CRN 96-33-3

CMF C4 H6 O2



RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

- L37 ANSWER 25 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
AN 1997:224374 HCAPLUS  
DN 126:264553  
TI Investigations into structure/property relationships for polyhedral oligomeric silsesquioxane (POSS) based methacrylate polymers  
AU Schwab, Joseph J.; Lichtenhan, Joseph D.; Kevin, P.; Chaffee, P.; Carr, Michael J.; Bolf, Alan G.  
CS Hughes STX, Phillips Lab., Edwards AFB, CA, 93524, USA  
SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (1997), 38(1), 518-519  
CODEN: ACPPAY; ISSN: 0032-3934  
PB American Chemical Society, Division of Polymer Chemistry  
DT Journal  
LA English  
AB Well-defined, thermoplastic hybrid polyhedral oligomeric silsesquioxane-based methacrylate polymers and their monomers were prepared. The thermomech. data, oxygen permeability, and microstructure of the polymers were presented.  
CC 36-5 (Physical Properties of Synthetic High Polymers)  
ST polyhedral oligomeric silsesquioxane polymethacrylate synthesis microstructure; thermomech data silsesquioxane based polymethacrylate;

methacrylate polymer silsesquioxane based oxygen permeability

IT Permeability  
(gas, oxygen; microstructure, thermomech. data, and oxygen permeability of polyhedral oligomeric silsesquioxane-based methacrylate polymers)

IT 164356-44-9  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(Kin preparation of polyhedral oligomeric silsesquioxane-based methacrylate polymers)

IT 79-41-4, Methacrylic acid, reactions 4115-83-7 7351-61-3,  
3-Trichlorosilylpropyl methacrylate 135225-24-0  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(in preparation of polyhedral oligomeric silsesquioxane-based methacrylate polymers)

IT 169391-90-6P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP  
(Preparation); RACT (Reactant or reagent)  
(in preparation of polyhedral oligomeric silsesquioxane-based methacrylate polymers)

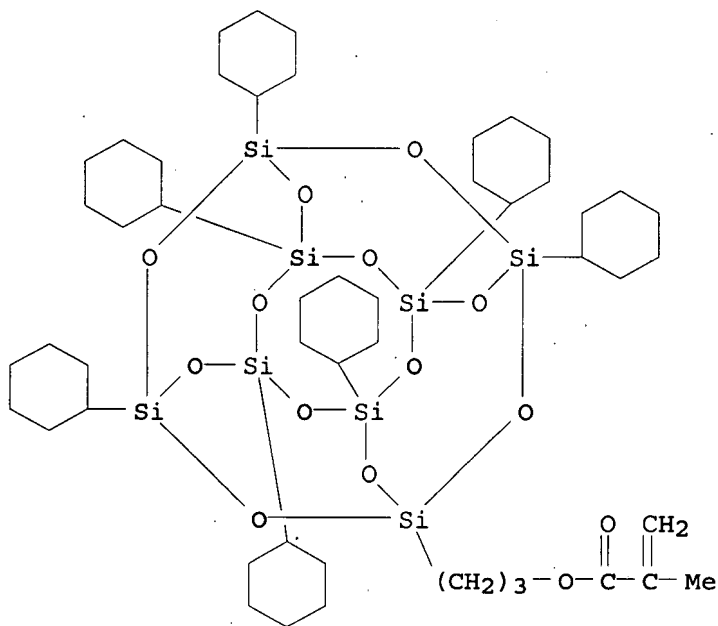
IT 169391-91-7P  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(in preparation of polyhedral oligomeric silsesquioxane-based methacrylate polymers)

IT 9011-14-7, PMMA  
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)  
(thermomech. data and oxygen permeability of blends of polyhedral oligomeric silsesquioxane-based methacrylate polymers with PMMA)

IT 169391-90-6P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP  
(Preparation); RACT (Reactant or reagent)  
(in preparation of polyhedral oligomeric silsesquioxane-based methacrylate polymers)

RN 169391-90-6 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)



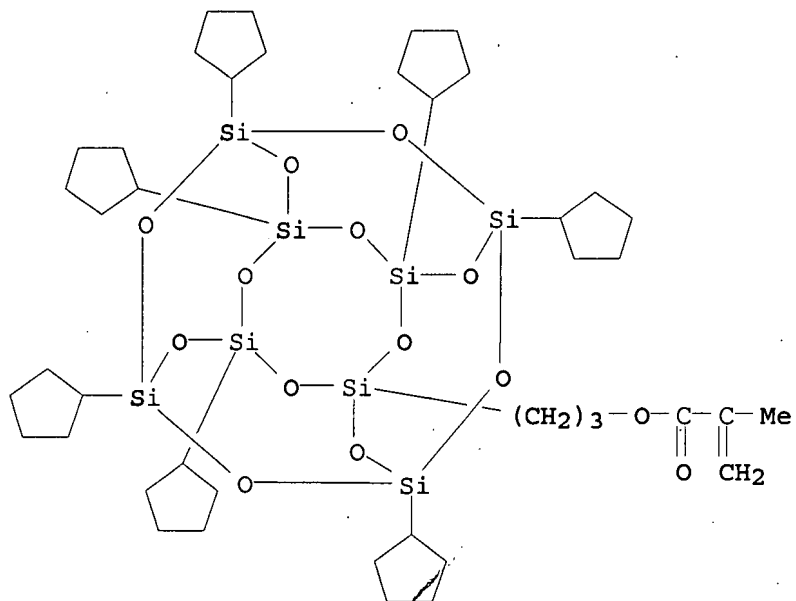
IT 169391-91-7P

RL: SPN (Synthetic preparation); PREP (Preparation)

(in preparation of polyhedral oligomeric silsesquioxane-based methacrylate polymers)

RN 169391-91-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)



L37 ANSWER 26 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN

AN 1995:983045 HCAPLUS

DN 124:30463

TI A One-Step Method for the Synthesis of a Vinyl-Containing Silsesquioxane and Other Organolithic Macromolecular Precursors

AU Yuchs, Steven E.; Carrado, Kathleen A.

CS Chemistry Division, Argonne National Laboratory, Argonne, IL, 60439, USA

SO Inorganic Chemistry (1996), 35(1), 261-2

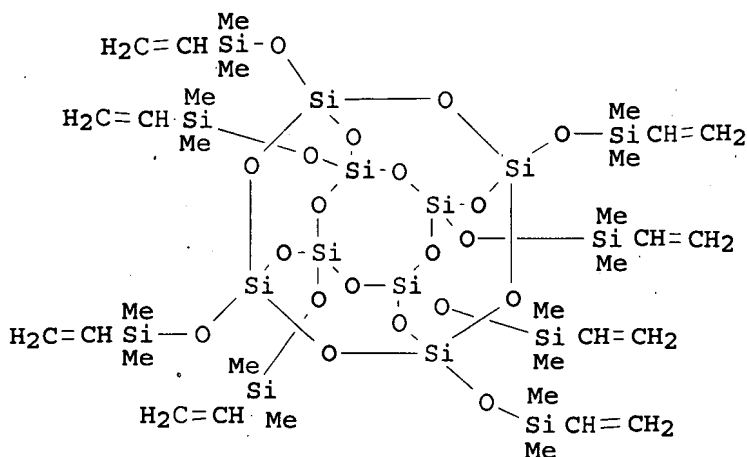
CODEN: INOCAJ; ISSN: 0020-1669

PB American Chemical Society

DT Journal

LA English

GI



# I

AB A unique 1-step synthesis method for the introduction of a vinyl-containing functional group into an octasilsequioxane, [Si8O12](OR)8 (I) was developed. The target mol., I, R = CH<sub>2</sub>=Ch(Me)(Me)SiO, is synthesized using Me4N silicate and chlorodimethylvinylsilane. The mixture is stirred in a mixed organic phase for 1 h, and then hydrolyzed to complete the formation of the siloxane. The target mol., along with the Br and malonate derivs., were synthesized and characterized by a variety of traditional techniques. These silsesquioxane-based derivs. are valuable compds. which can be used to form hybrid polymers of silicic acids and new ceramic materials. This synthesis method for a vinyl containing silsesquioxane provides a very simple, high yield starting material used in the production of organolithic materials with varied properties.

CC 35-2 (Chemistry of Synthetic High Polymers)  
Section cross-reference(s): 57

ST vinyl silsesquioxane one step macromol precursor  
IT Silsesquioxanes  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(one-step method for synthesis of vinyl-containing silsesquioxane and other organolithic macromol. precursors)

IT 126503-69-3P, Octakis(vinyldimethylsiloxy)octasilsesquioxane  
171979-93-4P 171979-94-5P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP  
(Preparation); RACT (Reactant or reagent)  
(one-step method for synthesis of vinyl-containing silsesquioxane and other organolithic macromol. precursors)

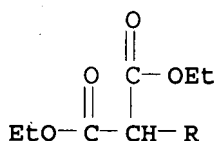
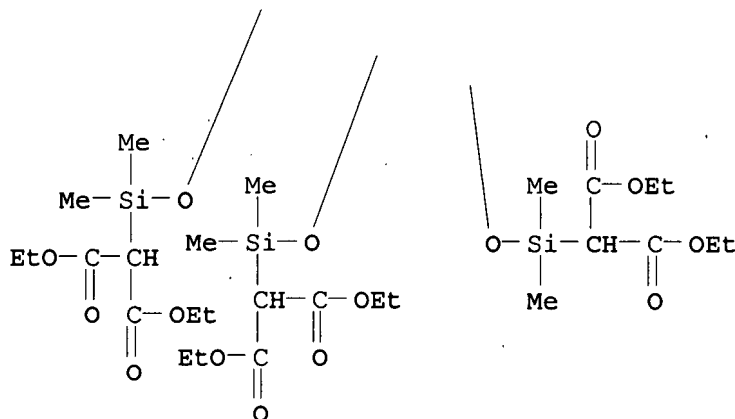
IT 1719-58-0, Chlorodimethylvinylsilane 53116-81-7, Tetramethylammonium silicate  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reactant; one-step method for synthesis of vinyl-containing silsesquioxane and other organolithic macromol. precursors)

IT 171979-94-5P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP  
(Preparation); RACT (Reactant or reagent)  
(one-step method for synthesis of vinyl-containing silsesquioxane and other organolithic macromol. precursors)

RN 171979-94-5 HCAPLUS  
CN Propanedioic acid, 2,2'',2''',2'''',2''''',2''''',2''''',2'''''' -  
[pentacyclo[9.5.1.13,9.15,15.17,13]octasiloxane-1,3,5,7,9,11,13,15-  
octaylctakis[oxy(dimethylsilylene)]]octakis-, hexadecaethyl ester (9CI)  
(CA INDEX NAME)

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

PAGE 2-A



L37 ANSWER 27 OF 27 HCAPLUS COPYRIGHT 2007 ACS on STN  
 AN 1995:894380 HCAPLUS  
 DN 123:286932  
 TI Linear Hybrid Polymer Building Blocks: Methacrylate-  
 Functionalized Polyhedral Oligomeric Silsesquioxane Monomers and Polymers  
 AU Lichtenhan, Joseph D.; Otonari, Yoshiko A.; Carr, Michael J.  
 CS Propulsion Directorate, Phillips Laboratory, Edwards Air Force Base, CA,  
 93524, USA  
 SO Macromolecules (1995), 28(24), 8435-7  
 CODEN: MAMOBX; ISSN: 0024-9297  
 PB American Chemical Society  
 DT Journal  
 LA English  
 AB A new class of methacrylic monomers and their corresponding linear  
 polymers have been developed. POSS monomers of the formula  
 R7Si8O12(CH2)3OC(O)C(CH3):CH2 were synthesized by corner capping the POSS  
 trisilanol cages R7Si7O9(OH)3 (where R = c-C6H11, c-C5H9) with  
 methacrylate containing trichlorosilanes. The utility of these reagents for  
 the preparation of linear methacrylate-based polymers containing the octameric  
 silsesquioxane cage structure as a pendant group was demonstrated. Homo  
 and copolymers of these systems are amorphous in nature and do not show  
 any thermal transitions below their 388° decomposition temps. The  
 thermal behavior of these systems is attributed to the dominant presence  
 of the pendant silsesquioxane cages.  
 CC 35-4 (Chemistry of Synthetic High Polymers)  
 ST methacrylate functionalized silsesquioxane synthesis radical polymn  
 IT Polymer morphology  
 (of methacrylate-functionalized polyhedral oligomeric silsesquioxane  
 polymers)

IT Silsesquioxanes  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (acrylic, preparation of methacrylate-functionalized polyhedral oligomeric  
 silsesquioxane monomers and polymers)

IT Polymerization  
 (radical, of methacrylate-functionalized polyhedral oligomeric  
 silsesquioxanes)

IT 169699-58-5P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP  
 (Preparation)  
 (copolymer; preparation of methacrylate-functionalized polyhedral oligomeric  
 silsesquioxane monomers and polymers)

IT 169699-56-3P 169699-57-4P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP  
 (Preparation)  
 (homopolymer; preparation of methacrylate-functionalized polyhedral  
 oligomeric silsesquioxane monomers and polymers)

IT 169391-90-6P 169391-91-7P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP  
 (Preparation); RACT (Reactant or reagent)  
 (macromer; preparation of methacrylate-functionalized polyhedral oligomeric  
 silsesquioxane monomers and polymers)

IT 4115-83-7 7351-61-3, 3-(Methacryloyloxy)propyltrichlorosilane  
 135225-24-0  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (preparation of methacrylate-functionalized polyhedral oligomeric  
 silsesquioxane monomers and polymers)

IT 169699-58-5P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP  
 (Preparation)  
 (copolymer; preparation of methacrylate-functionalized polyhedral oligomeric  
 silsesquioxane monomers and polymers)

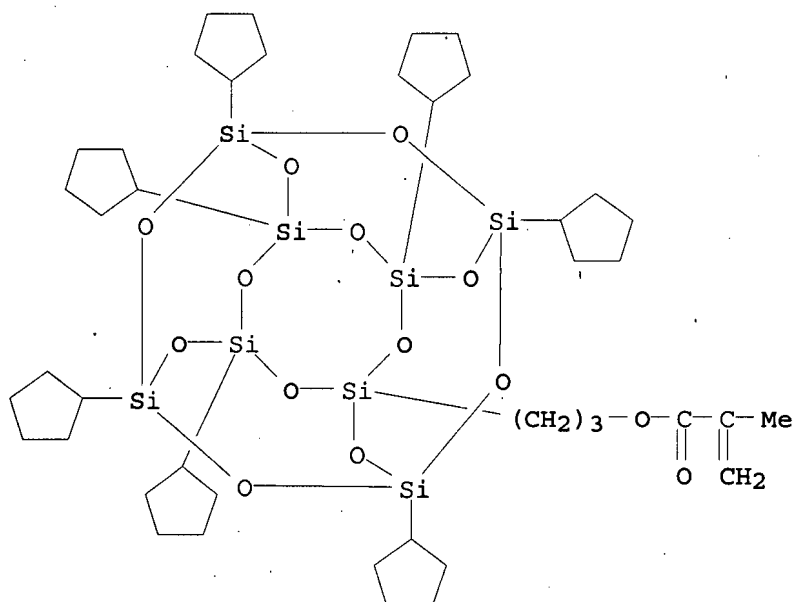
RN 169699-58-5 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclohexylpentacyclo[9.5.1.13,9.15,15  
 .17,13]octasiloxanyl)propyl ester, polymer with 3-  
 (heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl  
 2-methyl-2-propenoate (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

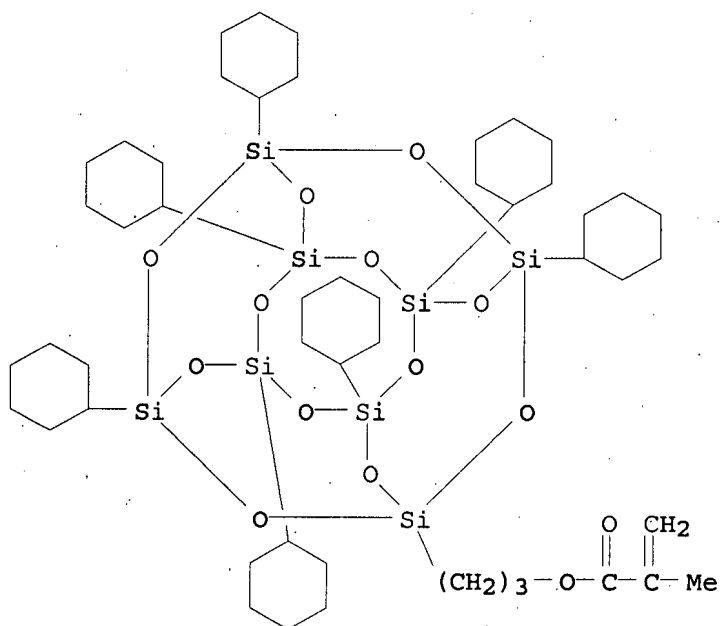
CMF C42 H74 O14 Si8



CM 2

CRN 169391-90-6

CMF C49 H88 O14 Si8



IT 169699-56-3P 169699-57-4P

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(homopolymer; preparation of methacrylate-functionalized polyhedral oligomeric silsesquioxane monomers and polymers)

KATHLEEN FULLER EIC1700 571/272-2505

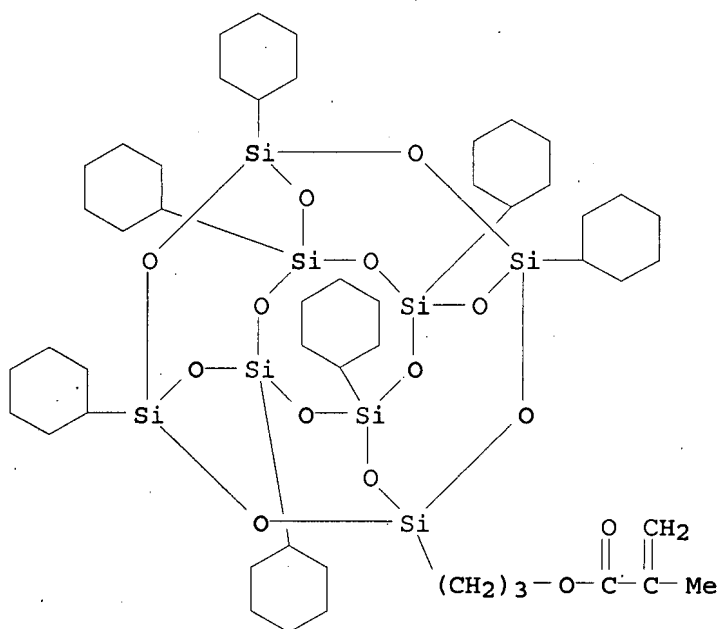
RN 169699-56-3 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclohexylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 169391-90-6

CMF C49 H88 O14 Si8



RN 169699-57-4 HCAPLUS

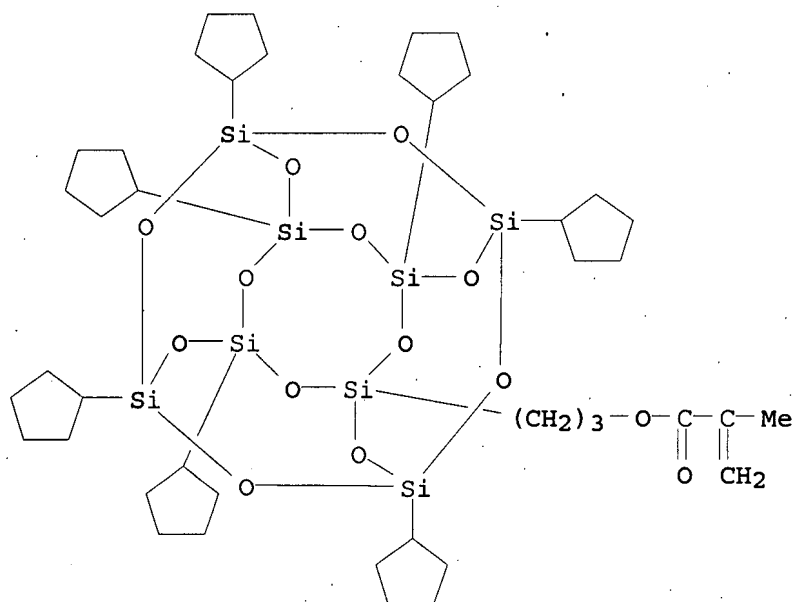
CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 169391-91-7

CMF C42 H74 O14 Si8





IT 169391-90-6P 169391-91-7P

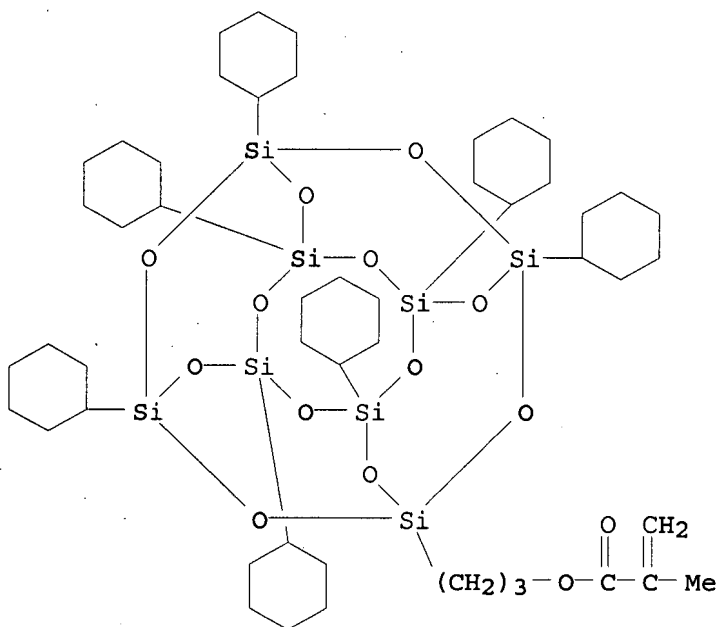
RL: RCT (Reactant); SPN (Synthetic preparation); PREP

(Preparation); RACT (Reactant or reagent)

(macromer; preparation of methacrylate-functionalized polyhedral oligomeric silsesquioxane monomers and polymers)

RN 169391-90-6 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)

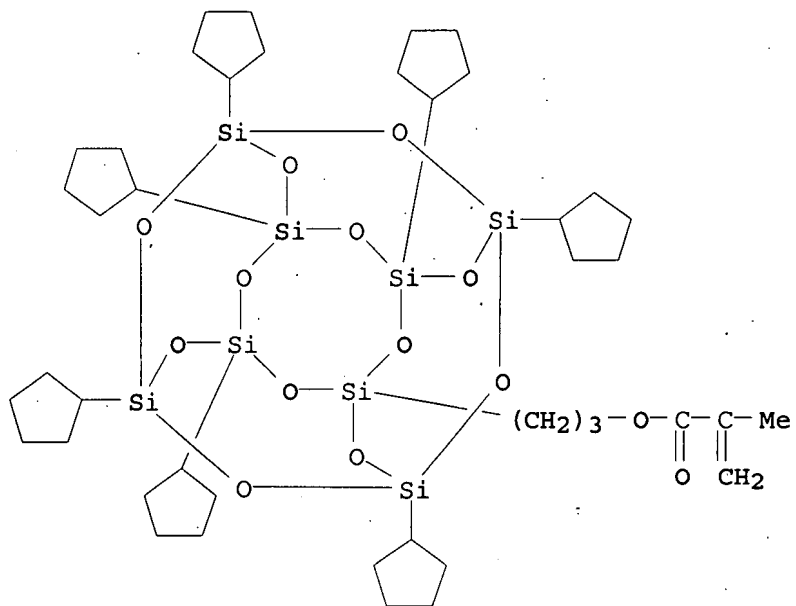


RN 169391-91-7 HCAPLUS

CN 2-Propenoic acid, 2-methyl-, 3-(heptacyclopentylpentacyclo[9.5.1.13,9.15,15.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)

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5.17,13]octasiloxanyl)propyl ester (9CI) (CA INDEX NAME)



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